DEVELOPING MEASURES TO ASSESS MISTREATMENT OF WOMEN DURING FACILITY-BASED CHILDBIRTH

by
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DISSERTATION ABSTRACT

Background: Mistreatment of women during childbirth is increasingly recognized as a significant issue globally. Research and programmatic efforts targeting mistreatment have been limited by a lack of validated measurement tools. This study aimed to develop a set of valid and reliable multidimensional measures for mistreatment. Secondly, it examined individual, provider, and delivery factors associated with mistreatment.

Methods: Continuous labor observations of 1,974 women in Nigeria (n=407), Ghana (n=912), and Guinea (n=655) were used from the World Health Organization's Multi-Country Study on How Women are Treated during Childbirth. Exploratory factor analysis was conducted to develop a scale measuring interpersonal abuse. Two indexes were developed through a modified OECD approach for generating composite indexes. Measures were evaluated for performance, construct validity, and internal consistency/reliability. Multivariable fixed effects logistic regression was conducted to identify factors associated with higher-than-average scores on each mistreatment measure.

Results: Three mistreatment measures were developed: a 7-item Interpersonal Abuse Scale, a 3-item Exams & Procedures Index, and an 11-item Unsupportive Birth Environment Index. Factor analysis results showed a consistent unidimensional factor structure for the Interpersonal Abuse Scale in all three countries, indicating good structural and cross-cultural construct validity. The scale had a reliability coefficient of 0.71 in Nigeria and approached 0.6 in Ghana and Guinea. Low correlations between mistreatment measures further supported construct validity of three separate measures. Construct validation via hypothesis testing yielded mixed results across countries. Both items within measures and measure scores were internally consistent across countries; each item co-occurred with other items in a measure, and scores

consistently distinguished between “high” and “low” mistreatment levels. Results of the multivariate correlates analysis were mixed. Age, education, parity, type of labor and birth attendants, and time of delivery were positively and negatively associated with higher levels of mistreatment in the three settings, underscoring wide variation in risk profiles for mistreatment by context.

Conclusions: The set of condensed, comprehensive multidimensional measures of mistreatment can be used in future research and quality improvement initiatives targeting mistreatment to quantify the burden, identify risk factors, and determine its impact on health outcomes. Further validation and reliability testing of the measures is needed.

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CHAPTER 1: INTRODUCTION, SPECIFIC AIMS, AND DISSERTATION OVERVIEW

1.1 INTRODUCTION

While there has been a significant decline of about 44% in maternal mortality over the last twenty-five years, there was still an estimated 303,000 maternal deaths worldwide in 2015, the majority of which occurred in sub-Saharan Africa [1, 2]. A key focus to reduce maternal morbidity and mortality has been to increase skilled birth attendance through facility-based childbirth [1, 3-10]. As the global agenda moves into the Sustainable Development Goal (SDG) era, there has increasingly been a call for more comprehensive efforts to measure and improve quality of care, including interpersonal aspects of care, to achieve significant gains in maternal health [5, 11, 12].

With this increasing emphasis in research, programs, and policies on strengthening quality of care to improve maternal health, there has been growing recognition of mistreatment of women during childbirth as a widespread issue globally [3, 13, 14]. Mistreatment, which can include abusive, disrespectful, negligent, or discriminatory care, has been shown to be both a key aspect of perceived poor quality of care and dissatisfaction with birth experiences, as well as a deterrent for women to seek facility-based delivery care. While interventions and advocacy efforts to address mistreatment have been gaining traction in recent years, these efforts largely rely on qualitative evidence, and have been limited by the lack of both a consensus on an operational definition of mistreatment and of validated tools to measure it [14-16].

To address this gap in the research, this study aimed to develop a set of valid and reliable multidimensional measures to assess mistreatment of women during facility-based childbirth. It then operationalized the resulting measures to examine individual, provider, and delivery factors associated with different dimensions of mistreatment. This research used continuous labor observation data from the Multi-Country Study on How Women are Treated During Childbirth

conducted in Nigeria, Ghana, Guinea and Myanmar, led by the World Health Organization (WHO) Department of Reproductive Health and Research; this study utilized data from Nigeria, Ghana, and Guinea to develop the measures. Developing condensed, yet comprehensive, validated measures of mistreatment is a critical step in this field to quantify the magnitude of the problem, identify risk factors, determine its impact on health outcomes, and reliably compare findings across multiple settings.

1.2 SPECIFIC AIMS

Using labor observation data from the WHO Multi-Country Study on How Women are Treated During Childbirth, the specific aims for this study were to:

> **Aim 1:** Develop a set of valid and reliable measures for mistreatment of women during facility-based childbirth, including the following dimensions: interpersonal abuse, inappropriate conduct of exams & procedures, and unsupportive birth environment, using samples of women in Nigeria, Ghana, and Guinea.
>
> **Aim 2:** Identify individual-, delivery-, and provider-related factors associated with mistreatment during facility-based childbirth in Nigeria, Ghana, and Guinea using the measures developed and validated in Aim 1.

For Aim 2, we hypothesized that higher levels of mistreatment across all dimensions are observed among women who are young, who are not married, or who have low levels of education, as well as among women who have a nurse or midwife as a primary labor and birth attendant, who deliver at night or on the weekends, or who do not have a companion present during labor and delivery.

1.3 DISSERTATION OVERVIEW

This dissertation contains five chapters. This first chapter provides a brief introduction and the study aims. Chapter 2 presents background for this study within the broader context of maternal health, quality of care, and violence against women through a review of the literature on mistreatment of women during childbirth, including an overview of the trajectory of

terminology and conceptualizations of mistreatment and a review of current measurement methods for mistreatment. The second chapter also proposes a framework for mistreatment that serves as a conceptual and theoretical guide for this study. Chapter 3 describes the methodology used to develop and assess a set of measures for mistreatment, including an overview of the data sources and a description of the analytic methods used to achieve the study aims. Chapter 4 presents the study results, including psychometric analyses, validation, and reliability test results of the measures developed, as well as multivariate results identifying individual, provider, and delivery factors associated with mistreatment. Chapter 5 discusses the main findings of each study aim, presents strengths and limitations of the study, and concludes with implications of this research for public health research, programming, and practice.

1.4 REFERENCES

1. Alkema, L., et al., *Global, regional, and national levels and trends in maternal mortality between 1990 and 2015, with scenario-based projections to 2030: a systematic analysis by the UN Maternal Mortality Estimation Inter-Agency Group.* The Lancet, 2016. **387**(10017): p. 462-474.
2. United Nations, *The Millenium Development Goals Report 2014* UNICEF, Editor. 2014: New York.
3. Bohren, M.A., et al., *Facilitators and barriers to facility-based delivery in low-and middle-income countries: a qualitative evidence synthesis.* Reproductive health, 2014. **11**(1): p. 71.
4. Bowser, D. and K. Hill, *Exploring evidence for disrespect and abuse in facility-based childbirth.* Boston: USAID-TRAction Project, Harvard School of Public Health, 2010.
5. Hulton, L., et al., *Using evidence to drive action: A "revolution in accountability" to implement quality care for better maternal and newborn health in Africa.* International journal of gynecology & obstetrics, 2014. **127**(1): p. 96-101.
6. Renfrew, M.J., et al., *Midwifery and quality care: findings from a new evidence-informed framework for maternal and newborn care.* The Lancet, 2014. **384**(9948): p. 1129-1145.
7. Kruk, M.E., et al., *Women's preferences for place of delivery in rural Tanzania: a population-based discrete choice experiment.* American journal of public health, 2009. **99**(9): p. 1666-1672.
8. Sawyer, A., et al., *Measures of satisfaction with care during labour and birth: a comparative review.* BMC pregnancy and childbirth, 2013. **13**(1): p. 108.
9. Hodnett, E.D., *Pain and women's satisfaction with the experience of childbirth: a systematic review.* American journal of obstetrics and gynecology, 2002. **186**(5): p. S160-S172.

10. Gabrysch, S. and O.M. Campbell, *Still too far to walk: literature review of the determinants of delivery service use.* BMC pregnancy and childbirth, 2009. **9**(1): p. 34.
11. Souza, J.P., et al., *Moving beyond essential interventions for reduction of maternal mortality (the WHO Multicountry Survey on Maternal and Newborn Health): a cross-sectional study.* The Lancet, 2013. **381**(9879): p. 1747-1755.
12. Tunçalp, Ö., et al., *Quality of care for pregnant women and newborns—the WHO vision.* BJOG: an international journal of obstetrics & gynaecology, 2015. **122**(8): p. 1045-1049.
13. Abuya, T., et al., *Exploring the prevalence of disrespect and abuse during childbirth in Kenya.* PLoS One, 2015. **10**(4): p. e0123606.
14. Bohren, M.A., et al., *The mistreatment of women during childbirth in health facilities globally: a mixed-methods systematic review.* PLoS medicine, 2015. **12**(6): p. e1001847.
15. Miller, S. and A. Lalonde, *The global epidemic of abuse and disrespect during childbirth: History, evidence, interventions, and FIGO's mother− baby friendly birthing facilities initiative.* International Journal of Gynecology & Obstetrics, 2015. **131**(S1).
16. Miller, S., et al., *Beyond too little, too late and too much, too soon: a pathway towards evidence-based, respectful maternity care worldwide.* The Lancet, 2016. **388**(10056): p. 2176-2192.

CHAPTER 2: LITERATURE REVIEW & CONCEPTUAL FRAMEWORK

2.1 CHAPTER OVERVIEW

This chapter presents background for this study through a review of the literature on mistreatment of women during childbirth. The significance of this work is discussed within the broader context of maternal health and quality of care. An overview of the trajectory of terminology and conceptualization of mistreatment is presented, followed by a review of current measurement methods for mistreatment and a discussion of the impact of mistreatment. Finally, a framework for mistreatment is proposed that serves as a conceptual and theoretical guide for the study.

2.2 BACKGROUND

2.2.1 Significance

An estimated 303,000 maternal deaths occurred worldwide in 2015, two-thirds of which were in sub-Saharan Africa [1]. While there has been a significant decline of about 44% in maternal mortality over the last twenty-five years during the Millennium Development Goal (MDG) era, the reduction was far off the mark of the MDG 5 goal of a 75% decline in the global maternal mortality ratio (MMR) [1, 2]. As the global agenda has moved into the Sustainable Development Goal (SDG) phase, the SDG 3 goal calls for a pressing need to achieve universal health coverage, including universal coverage of sexual and reproductive healthcare [17]. A major focus of efforts to reduce maternal mortality and morbidity for both MDG and SDG objectives has been to increase skilled birth attendance through facility-based childbirth [1, 3-10]. This strategy has been somewhat successful, as facility delivery rates have increased by 12% over the last twenty years in low-resource settings [2, 18]. Still, only about half of deliveries in these settings, and in sub-Saharan African countries in particular, occur in health facilities, even in countries with high antenatal care coverage [3, 7, 18].

With an increase in facility deliveries comes a parallel shift of largely preventable maternal mortality and morbidity from community settings into health facilities [7, 11, 14]. Thaddeus & Maine outlined their classic "3 Delays" model for accessing obstetric care in 1994, highlighting delays in 1) deciding to seek care, 2) reaching a health facility, and 3) the provision of adequate care [19]. In response to this model, much emphasis in improving maternal health outcomes has focused on the first two delays on the premise that if women reach facilities, many barriers to improving maternal health outcomes would be overcome [3, 10, 16]. Many research and program efforts target resource availability, logistical and access issues, and strengthening maternity care systems through interventions to promote increased facility-based deliveries [3, 11]. A recent multi-country study on maternal and newborn health by the World Health Organization (WHO), however, showed that high coverage of essential interventions did not dovetail with expected reductions in maternal mortality [11]. Researchers have increasingly called for a more comprehensive examination of the third delay, and underscored that to achieve significant gains in maternal health, a focus on the third delay is critical by improving quality of care (QoC), including interpersonal aspects of care [5, 11, 12].

Significant research has shown that skilled attendance at delivery in a health facility is associated with better birth outcomes for both mothers and newborns, yet the reasons women do not deliver in facilities are complex [3, 4, 9, 20-28]. Recent systematic reviews of studies of facility-based deliveries highlight logistical barriers (both financial and geographic), household decision-making dynamics, sociocultural views of pregnancy and childbirth, availability of medical interventions and resources, and the perceived need or benefit of facility births as important determinants of delivery location [9, 14, 22-24]. More recently, a consistent factor impacting delivery location is women's perceived QoC, including quality of the provider-patient

relationship, the level of support during delivery, and respectful and dignified treatment from providers [7, 20, 26, 29].

There is currently significant global attention on QoC, including quality of maternal and newborn healthcare. A recent Lancet Global Health Commission on QoC concluded that poor QoC has become a larger barrier to reducing mortality than inadequate access. It is estimated that about 8 million deaths a year in low- and middle-income countries (LMICs) could be prevented by high quality health systems—including half of maternal deaths [30, 31]. The Commission also noted that most health systems measures fail to capture metrics that are particularly important to people, including user experience, confidence in the health system, and health outcomes [30, 31].

While there has been significant research on more technical aspects of QoC, there is a growing recognition globally that a key deterrent for women to seek facility-based delivery care is disrespect, abuse and mistreatment of women during childbirth (hereafter referred to in short as "mistreatment") [3, 13, 14]. A proliferation of recent research has documented abusive, disrespectful, negligent and discriminatory care of women delivering in facilities. A global systematic review of mixed-methods research by Bohren et al. (2015) cited widespread mistreatment in 34 countries, including low-, middle-, and high-income countries in every major region of the world [14]. Directing attention to mistreatment is pivotal to improve the overall quality of maternity care as well as increase utilization of facility-based maternity services [17].

2.2.2 Trajectory of the Definition of Mistreatment

Current definitions and measures of mistreatment vary widely, posing a challenge in comparing recent evidence on the prevalence, risk factors, and impact of mistreatment. This

section outlines the trajectory in the literature of different operational definitions and classification systems for mistreatment.

Terminology

Several terms have been used to describe poor quality care or abusive treatment of women during childbirth. These terms have been framed as a subset of the larger problem of violence against women more generally as a human rights violation, as a QoC or health systems concern, or a combination of the two frameworks [32]. Mistreatment has been anecdotally noted for years, though concerted efforts to research this phenomenon have mostly progressed in the last decade [15, 33, 34]. The first evidence synthesis of violence against women in maternity care was published over 15 years ago by d'Oliveira et al. (2002); the authors deemed it an "emerging problem," citing four main forms of violence: physical, sexual, verbal and neglect [34]. They noted that this violence was recurring, often intentional, and targeted at certain groups of women (particularly women with low income/education levels, of racial, ethnic or religious minorities, or who were unmarried), and was related to poor quality and low effectiveness of maternal health interventions [34]. Qualitative research in the Dominican Republic during this time (2003) noted paradoxes between a setting with high facility delivery rates yet stagnantly poor maternal health indicators, finding that poor QoC, overcrowding, and abuse/neglect during labor and delivery may have been contributing to this paradox [35].

Around the same time, a movement among researchers, healthcare professionals, and advocates for the humanization of birth gained momentum in Brazil, spreading to the rest of Latin America and resulting in the establishment of The Latin American Network for the Humanization of Childbirth in 2000 [36]. The term "obstetric violence" was coined in both public health and legal arenas in reaction to high rates of unnecessary obstetric procedures and

growing awareness of disrespect and abuse of women in facilities in the region. “Obstetric violence” is situated within the larger framework of structural violence against women, with gender and gender inequality as central elements in operationalizing the concept [15, 37, 38]. More recent ethnographic research on mistreatment in rural India echoes this framing. Findings from this work note that the field of maternal health has long emphasized that an increase in facility births is likely to promote safe, successful births, but the benchmark of “safe and successful” has largely been limited to whether a woman and infant survive a birth. The authors comment that growing awareness of mistreatment has highlighted a paradox of the facility as a simultaneous place of both safety and violence for childbirth [39], an inherently gendered experience. This paradox parallels other research on violence against women where an intimate partnership, a family, a household, or a community can simultaneously serve as a context of safety and violence for women.

A landmark landscape analysis by Bowser & Hill (2010) with the USAID TRAction Project was the first attempt to review existing evidence and convene an expert working group to develop a classification system for “disrespect and abuse during facility-based childbirth [4]”. The group proposed seven categories of disrespect and abuse that centered on interpersonal behaviors: 1) physical abuse, 2) non-consented care, 3) non-confidential care, 4) non-dignified care, 5) discrimination, 6) abandonment of care, and 7) detention in facilities [4, 15]. The working group called for an increase in primary studies on the topic, noting that refinement of an evidence-based definition and validated measurement tools were needed to move research forward [4].

In 2014, Freedman et al. took the Bowser & Hill (2010) classification a step further by offering the first definitional criteria for determining disrespectful and abusive interactions,

underscoring that local context is central to defining disrespect and abuse. They contextualized the criteria in terms of provider behavior, facility conditions, and "other factors" that could locally constitute disrespect and abuse [27, 37]. They also introduced a multi-level framework that showed the interplay between individual, structural, and policy-level determinants of disrespect and abuse [27]. Freedman et al. (2014) drew criticism about the challenges of operationalizing their criteria that were so grounded in context-specific factors into validated measurement tools that allowed for comparability across settings [14, 15, 37].

The WHO also became vocal on this issue in 2014 when it released a statement on the *"Prevention and elimination of disrespect and abuse during facility-based childbirth,"* couching mistreatment within both human rights and QoC frameworks. It called for a guarantee that every woman has access to respectful and dignified care as an essential component of quality care [40, 41]. In an effort to move the field toward an agreed-upon definition that can be used to develop measurement tools, Bohren et al. (2015) published a global mixed-methods systematic review of mistreatment that resulted in the first evidence-based typology for mistreatment [14]. Building on the Bowser & Hill classification, Bohren et al. proposed a 7-part typology underscoring that mistreatment occurs at two levels: 1) the interpersonal level between provider and patient and 2) the systems level through failures of the heath facility and health system; both may impact a woman's birth experience and birth outcome [14]. The term "mistreatment" was used deliberately in the WHO typology to broaden the previous definitions of Bowser & Hill (2010) and Freedman et al. (2014) to include women's experiences of both intentional and unintentional abuse at the interpersonal and systems levels [14, 42]. The authors were also clear to distinguish that respectful maternity care (RMC) is not just the absence of mistreatment [41, 42]. The typology includes the following domains: 1) physical abuse, 2) sexual abuse, 3) verbal abuse, 4)

stigma and discrimination, 5) failure to meet professional standards of care, 6) poor rapport and communication between women and their providers, and 7) health system conditions and constraints (**Appendix 1)** [14].

New research followed these seminal papers, with many studies based on piecemeal applications of the Bowser & Hill classification system. Emerging research still uses variable terminology, including "disrespect and abuse," "mistreatment," "DACF: disrespectful/abusive care during childbirth in facilities," "dehumanized care," or "disrespectful maternity care." As awareness has grown, numerous advocacy and programming efforts targeting mistreatment have run parallel to emerging research. The White Ribbon Alliance for Safe Motherhood issued the Charter for the Universal Rights of Childbearing Women (2011), formally recognizing seven fundamental rights during childbirth that mapped directly onto the Bowser & Hill (2010) classifications [43]. Mistreatment was also a hallmark concern of the International Federation of Gynecology and Obstetrics (FIGO) 2015 World Congress and Global Maternal/Newborn Health Conference [44], as well as the WHO/UNICEF/FIGO Mother-Baby Friendly Birth Initiative [15]. While mistreatment is a global issue occurring at relatively high levels, as noted below, advocacy and intervention efforts have relied largely on qualitative evidence. Full global consensus has yet to be reached on an operational definition of mistreatment, a significant barrier to developing validated measurement tools.

2.2.3 Current Measurement of Mistreatment

A growing number of quantitative studies have been conducted to measure mistreatment using differing and inconsistent definitions and measurement tools. Overall prevalence estimates of any mistreatment, broadly defined, range widely across these studies from 13-98% [13, 45-59]. A recent systematic review of measurement methods by Sando et al. [58] notes that validity

and comparability of the estimates is limited as all studies are based on different study designs and significantly different operational definitions to measure mistreatment. "Mistreatment" will be used below as a catchall term to describe the measures used in the studies with the caveat that it captures a broad spectrum from actual abuse to poor quality of care.

Studies that rely on the Bowser & Hill classifications were undertaken in Nigeria [48], Malawi [45], Tanzania [49, 60], and Ethiopia [50, 61], as well as the *Staha Study* in Tanzania [46, 49, 62, 63] and the *Heshima Project* in Kenya [64, 65]; the latter two assessed the impact of different interventions on reducing mistreatment. The findings of a recent single-site study in southeastern Nigeria using a 28-item survey based on the Bowser & Hill classifications indicated that 98% of postpartum women reported at least one experience of mistreatment (experiences with specific mistreatment categories ranged from 22% (detainment in a health facility due to inability to pay), to 35% (physical abuse), to 54% (non-consented care)) [48]. Sethi et al. (2017) conducted a study in Malawi that was one of the first to use labor observation data to measure mistreatment [45]. The study was an evaluation of the *Helping Babies Breathe* intervention, so items in the observation tool were intended to measure a mix of interpersonal and technical QoC. Items were included on non-dignified care, non-consented care, non-confidential care, abandonment, and physical abuse based on both the Bowser & Hill categories and The Jhpiego MCHIP Respectful Maternity Care (RMC) Checklist; breaches in privacy (58%), discouragement from asking questions (73%), and lack of encouragement to have a birth companion present (83%) were commonly observed [66].

The *Heshima Project* (2011-2014) was a multi-facility study that assessed the level of mistreatment and determined the effects of a policy and provider training-oriented intervention to reduce mistreatment in Kenya. It adapted Bowser & Hill classifications and collected data

through facility exit surveys with women at baseline, and through direct labor observations and exit surveys during the follow-up period. Baseline estimates indicated that 20% of women reported at least one experience of mistreatment (prevalence range among different categories of abuse was 4-18%). Women without birth companions, women who delivered during night shifts, adolescents, and women with higher parities were more likely to experience certain forms of mistreatment. While the investigators documented a 7% decrease in mistreatment overall in the post-intervention period, the study did not include a control group, which limits the ability to make inferences about the effectiveness of the intervention [13, 64, 65].

The *Staha Study* (2011-201) used items based on the Bowser & Hill framework to conduct both labor observations and surveys with women (one facility exit interview and one follow-up survey in communities) to measure the prevalence of mistreatment in Tanzania. The investigators noted large differences in women's reports based on when surveys were conducted; 15% reported at least one instance of mistreatment during the facility exit interview but reports among the same cohort of women jumped to 70% when assessed a few weeks later in their communities (prevalence of each category of disrespect & abuse was above 50% during this follow-up survey). The observation tool was based on an abbreviated checklist that did not capture all Bowser & Hill's categories, though findings from observations confirmed high levels of non-consented care (84%), breaches of confidentiality (20%), lack of privacy (58%), and either bed-sharing (84%) or putting women in postnatal ward beds that had not been cleaned (66%) [46, 58, 62, 67].

An overall mistreatment prevalence of 18% was reported in a different multi-facility study in Tanzania that measured mistreatment using 14 items based on the Bowser & Hill framework. Women who experienced any mistreatment had a 74% decreased odds of satisfaction

with delivery and were half as likely to plan to have their next delivery in the same facility [49]. This 14-item tool had been previously developed by Kruk et al. (2014) in a similar study in Tanzania, using formative qualitative methods to adapt the Bowser & Hill categories to the Tanzanian context. Again, the prevalence of mistreatment was higher when assessed during follow-up surveys in community settings (28%) compared to facility exit surveys (19.5%), and women with low income and education levels were more likely to report mistreatment (48% and 80% increased odds, respectively) [60].

The Jhpiego MCHIP RMC Checklist was the basis of mistreatment survey items in a study in Ethiopia [68] and a multi-country study in East Africa [69]. The study in Ethiopia used a 23-item facility exit survey in multiple facilities, and found that 78% of women reported experiencing at least one form of mistreatment, though all women in the sample reported violations in obtaining informed consent and were not granted their preference for a birthing position [68]. One study in India generated its own mistreatment criteria and compared it to the WHO typology [47]. The authors only measured interpersonal mistreatment items (i.e., they did not assess health systems conditions or constraints), and found an overall prevalence of 21% [47].

Investigators recently developed a scale to measure women's perceptions of respectful maternity care in facilities in Ethiopia as part of a Jhpiego MCHIP RMC study [61]. Scale items were based on a combination of the Bowser & Hill (2010) classification, a literature review, and qualitative research. The objective was to create a scale to measure RMC more broadly rather than focusing specifically on mistreatment; it included a variety of items, only some of which were specific mistreatment indicators. While the scale was shown to be reliable in measuring

components of respectful care with a preliminary assessment of validity, the authors' analysis was exploratory and the final scale was not validated using confirmatory approaches [61].

There are important limitations to these studies measuring mistreatment. Even those using the same classification system select different sets of indicators or behaviors from each system to construct different operational definitions of mistreatment. Further, each study used a different non-validated tool, collecting data through different modes of assessment with women either in facility exit surveys or postnatal surveys in communities, direct labor observations, or a combination of modes [46-49, 60-63, 69]. Another key limitation of these studies is that mistreatment is typically measured as a binary outcome of experiencing at least one kind of mistreatment, particularly when the study assessed risk factors [47, 49, 60-62, 64, 65, 69]. An overall binary indicator poses two constraints. First, given the wide range of specific behaviors and events that can be included in the instruments to characterize mistreatment, a binary indicator does not measure nuances in the diversity of women's experiences, nor does it distinguish between different types of mistreatment, thereby equating all forms of abuse (e.g., "harsh or rude language" and "stitching the perineum without anesthesia" are each assigned a "yes" for experiencing mistreatment). The different mistreatment forms may in fact lie represent different dimensions and lie on a gradient of severity, as well as a continuum from outright abuse to poor quality of care; embedding evaluation of this gradient in a measurement tool may allow for determining whether risk factors or outcomes differ with increasing "doses" of different mistreatment types [70-74]. Second, it does not allow for assessing overlap and co-occurrence in various forms of mistreatment to understand a full picture of women's constellations of experiences.

To address some of these limitations, Afulani et al. developed and validated a full 30-item scale, as well as a shortened 13-item version, measuring person-centered maternity care (PCMC) in Kenya, Ghana, and India. The scales were based on women's responses to items related to dignity/respect, communication and autonomy, and supportive care. The scales include more subjective measures of patient perceptions of care in addition to reports of specific, discrete mistreatment or abuse items. While there is some overlap in the domains in the PCMC scale with the WHO mistreatment typology, the authors make clear that PCMC is broader than measuring specific forms of mistreatment and abuse as it seeks to situate RMC as a core feature of person-centered care [52, 75-77].

Quantitative studies have been critical in providing preliminary estimates of the burden of mistreatment in a variety of settings. These studies focus heavily on interpersonal forms of abuse, often ignoring larger facility-level failures and poor quality during the process of care [14, 78]. While interventions are currently being developed and advocacy efforts are gaining momentum, the evidence base underpinning them has been hampered by the lack of global consensus on an operational definition of mistreatment. Validated measurement tools are essential to quantifying the magnitude of this problem, identifying risk factors, and determining its impact on health outcomes.

2.2.4 Forms and Impact of Mistreatment

Both quantitative and qualitative research has documented a wide range of specific forms of mistreatment. Several forms of physical abuse have been documented in LMICs, including punching, slapping, pinching, and kicking [13, 14, 21, 23, 24, 33, 36, 44, 46, 60, 62, 69, 78-83]. Less common, though still identified in a number of settings, are reports of women being physically restrained or tied to a delivery bed, gagged during delivery, or stitched without

anesthesia [7, 14, 48, 49, 60]. Modes of verbal abuse can include shouting, negative or threatening comments (e.g., threatening to withhold care, threatening poor outcomes), blaming women for poor outcomes, and insulting, discriminatory, or stigmatizing comments about a woman's sexual activity, race/ethnicity, religion, socioeconomic status (SES) or age [13, 14, 27, 36, 64, 69, 78-80, 82-86].

There are also reports of women being neglected during both labor and delivery, in some instances resulting in women delivering without a skilled birth attendant either in a bed they share with other laboring women or on the floor [14, 24, 35, 44, 48, 87-89]. Previous studies have also found that women may be asked for a bribe or detained (either themselves or their infants) in a facility due to inability to pay a medical bill [13, 14, 24, 36, 48, 49]. While the majority of work identifying types of mistreatment has been done in LMICs, recent research in higher-income countries like the United Kingdom, the United States, and Canada find that mistreatment is also reported in these settings, particularly stigmatizing or discriminatory comments and non-consented or neglectful care among immigrants or racial, ethnic, or religious minorities [56, 57, 90-93].

Mistreatment by providers can occur across the pregnancy and maternity care continuum, but labor and delivery is a particularly vulnerable period which may render a significant impact of mistreatment on both maternal/infant health outcomes and on shaping future maternity care-seeking [13, 16, 40]. A few studies in both Eastern and Western African countries have underscored this potential impact; in settings with high facility-based antenatal care coverage, facility delivery is still very low [13, 21, 32, 48, 94-97]. Very limited research has looked at the actual impact of mistreatment. Again, the indirect impact has been shown to influence both

satisfaction with the birth experience and decisions to utilize facilities for future deliveries [3, 7, 15, 27, 86].

Only two studies were identified that quantitatively linked mistreatment with health outcomes [47, 98]. An analysis of data from the Pelota Birth Cohort in Brazil found that mistreatment during childbirth, measured as physical abuse, verbal abuse, denial of care, and undesired procedures, was associated with increased odds of both moderate and severe postpartum depression at 3 months postpartum; experiencing verbal abuse, physical abuse, or three or more kinds of mistreatment particularly contributed to this association [98]. Raj et al.'s (2017) study in India using a modified WHO typology (physical or verbal abuse, stigma/discrimination, failure to meet professional standards of care, and non-supportive care) found that women who experienced mistreatment had 32% higher odds of intrapartum complications and twice the odds of postpartum complications (including postpartum depressive symptoms) than women who did not report mistreatment [47]. Qualitative work has reinforced this finding, noting that certain forms of mistreatment, particularly abandonment/neglect that may result from significant staffing or resource constraints, may increase the potential for unaddressed complications when women are left to labor and deliver alone [35, 87] or undergo unnecessary surgical procedures [3, 14, 15]. Importantly, experiencing violence and other abuse during childbirth can be considered a poor health outcome in itself, and may be distressing and disempowering for a woman, impacting her right to respectful and dignified care during birth [12, 14, 40, 83].

2.3 THEORY AND CONCEPTUAL FRAMEWORK

As noted above, mistreatment during childbirth is increasingly documented as a significant issue that cannot be dismissed as abusive behavior of a few "bad" providers [32, 83].

To better understand its determinants, the proposed conceptual framework guiding this dissertation research adapts Heise's (1998) [99] ecological framework for violence against women and the WHO framework for QoC for pregnant women and newborns (2015) [12]. This approach maps the potential determinants of mistreatment as the result of complex interactions between factors at multiple levels: the societal level (macrosystem), health system (exosystem), health facility (mesosystem), interpersonal (microsystem), and the individual level (personal history) **(Figure 2.1)**. As this study primarily focuses on developing measurements for mistreatment, this framework most directly applies to the assessment of risk factors for mistreatment at the individual, provider, and delivery levels in Aim 2, and delves into the broader structural context of mistreatment.

Dimensions of Mistreatment

The seminal formative papers on mistreatment have grappled with conceptualizing its dimensions, drawing from the early obstetric violence movement in Latin America that deemed structural violence or more "passive" forms like unnecessary medical intervention or non-consented care as key components of violence occurring in parallel with forms of interpersonal abuse [37, 38]. Bohren et al. (2015) conceptualized "overt" (e.g., physical, sexual, and verbal abuse, and stigma/discrimination) and "covert" forms (e.g., neglect, failures to meet standards of care, facility-level system failures) in formulating the WHO typology for mistreatment [14]. Jewkes et al. (2015) also propose two dimensions: intentional use of violence and negligent withholding of care/structural disrespect, though they are careful to note that intentionality should not be the defining criterion of abuse [83]. In contrast, The White Ribbon Alliance posited that the categories of mistreatment occur not in binary dimensions, but along a continuum from subtle discrimination to overt violence [15, 43].

In this study, we follow the WHO in using the term "mistreatment" for this varied and complex phenomenon. As mentioned, the WHO uses mistreatment deliberately to encompass both intentional and unintentional abuse or poor care at interpersonal- and system-levels [14, 42]. Importantly, in this research we posit that the WHO typology contains dimensions that do not share one common underlying factor, although they may form along two frameworks. We operationalize "mistreatment" as capturing a spectrum of behaviors and experiences ranging from outright abuse to poor quality care along two underlying, interrelated dimensions, analogous to the WHO QoC Framework (2015) dimensions of "provision" and "experience" of care in maternal and newborn health [12]; in the context of mistreatment, these dimensions include: 1) interpersonal abuse, and 2) mistreatment in the process of care.

First, the latent construct underlying physical abuse, verbal abuse, and stigma/discrimination is related to interpersonal abuse within a more general violence framework. Second, the latent construct underlying failures to meet professional standards of care, poor rapport between women and providers, and health systems conditions/constraints is intrinsically tied to mistreatment in the process of care within a broader quality of care framework. In acknowledging these different constructs, we recognize that the underlying reasons for various forms of mistreatment can differ significantly; some may result from intentional or willful acts (e.g., punching or slapping a woman), but others may reflect a lack of physical and human resources or facility policy rather than intentional abuse by providers (e.g., a lack of space or beds may lead to bed sharing, or a facility policy may underlie failure to offer a woman to have a birth companion). This distinction is important not only from a measurement perspective, but also in tailoring specific, effective, and sustainable interventions and acceptable responses to prevent and address different forms of mistreatment.

Macrosystem: Society/ Culture

The macrosystem represents the sociocultural environment, societal norms, and views that shape the determinants of mistreatment at every level [99]. Mistreatment may be enabled by structural gender inequality that underlies women's low status and rigid gender norms. Previous work has shown that in settings with large gender inequality, societal tolerance and acceptability of using violence against women as a mechanism of punishment or control is pervasive. This tolerance normalizes mistreatment such that it may not even be viewed as poor or abusive treatment [70-72, 74, 79, 83, 99-101]. Similarly, rigid gender norms may render women passive and disempowered to speak against abusive behavior, or these norms may frame childbirth as a rite of passage for women that they must endure without complaint. Taken together, these forces are viewed as underpinning women's low expectations of quality maternity care and acquiescence to mistreatment. They may especially apply in low-income settings where the norm can be set that receiving any obstetric care is a privilege, let alone high-quality, respectful care [9, 23, 24, 32, 33, 48, 83, 87, 102].

Exosystem: Health System

Several factors at the health system level may facilitate a structural environment that fosters mistreatment in a facility. The WHO QoC framework highlights six building blocks of the health system that include organizational and physical elements that form the structure for the process of care [12]. In this study, these elements also serve as underpinnings for mistreatment and poor quality care, particularly at the facility-level [12, 14]. These blocks include: 1) health workforce, 2) service delivery, 3) information, 4) medical products, vaccines, and technology, 5) leadership/governance, and 6) financing [12]. Constraints on any of these blocks are particularly common in LMICs, and have been identified as important antecedents to more proximate

facility-level factors that limit the capacity of providers to implement high quality and respectful care [13, 32, 36, 65, 84].

Previous work on provider perspectives of mistreatment has found that mistreatment is often normalized during training programs in nursing, midwifery, or medicine. New trainees report that even if good quality care is taught as a key value, they see mistreatment as common in practice with no dominant model of patient care that challenges this norm by emphasizing respectful interpersonal care [34, 100, 101, 103]. Qualitative research indicates that providers who act abusively are often those occupying lower roles in the provider hierarchy (typically midwives or nurses) who also feel disempowered within the health system. These studies suggest that mistreatment is a byproduct of providers negotiating their professional security and power within health systems that abuse them or limit their autonomy [15, 32, 102]. This research also identified a common "culture of blame" in health systems that faults providers for negative maternal and infant outcomes [32]. Providers cite the impetus for using aggressive or abusive tactics is to get women to cooperate or deliver quickly out of fear of being blamed for a poor outcome [32, 79, 100].

The provider-patient power dynamic operates at this level rather than the microsystem level because it refers to structural theory about why some providers mistreat women; these explanations are akin to those in intimate partner violence research [70, 83, 99, 100]. Providers may use mistreatment as a strategy to control women's bodies and behaviors to assert control, establish professional distance, and reify the power differential between provider and patient [21, 23, 34, 83, 100, 103]. They also may not recognize alternative approaches to communicating with patients and blame women for driving them to use these tactics [32, 79-81, 103, 104].

Mesosystem: Health Facility

The mesosystem at the health facility level represents two layers in this framework. First, it links the larger institutional factors in the health system ("exosystem") with an immediate context for mistreatment, the provider-patient relationship [51, 99]. Second, it serves as an additional immediate context for poor quality care through facility-level resource constraints, policies and facility culture that may serve as conduits for mistreatment [14]. Variability in type of health facility and capacity to manage obstetric emergencies may contribute to the risk environment for mistreatment. For example, a few mixed-methods studies find that women who deliver in smaller health centers have lower odds of mistreatment than those in large hospitals, as well as lower odds in private versus public hospitals; these findings may highlight the importance of health system factors, as well as facility policies and norms in providing high quality and respectful care [48, 50, 51, 59, 68, 103].

An acute risk environment for mistreatment and poor quality care is fostered by staff shortages, overcrowded facilities, under-financing, poor infrastructure and resource availability, and non-functional information and referral systems to manage patients, which can lead to provider stress, fatigue and poor or demoralized staff attitudes [3, 14, 15, 32, 36, 78-82, 85]. Further, available staff may be inadequately trained to appropriately manage complicated cases, and there may be little distinction in treatment plans for women with normal and complicated labors [35]. Thus, the context for mistreatment at the health facility level is complex. Providers may value high QoC and indeed may provide quality and respectful care at times, but can also provide poor care to women during the process of care as a result of these environmental factors [12, 101].

Microsystem: Provider-Patient Interaction

The provision of high-quality care in resource-limited facilities is challenging, at times maybe prohibitively so. However, resource constraints alone are not the only contributors to mistreatment as both forms of interpersonal abuse and mistreatment in the process of care are reported even in well-equipped and well-staffed facilities [21, 24, 48, 83]. Jewkes et al. (2015) note that while facility environment factors are critical in creating poor conditions for both staff and patients, solely focusing on strengthening facilities and maternal health systems masks the need for accountability for direct interpersonal abuse at the provider-patient level [83]. Both quantitative and qualitative work show differences in mistreatment by provider type, with generally more frequent reports of perpetration by midwives and nurses than doctors (though this could be a function of lack of doctors in lower resource settings, where nurse/midwife interaction is more common; as the primary front line providers, midwives may experience the most constraints related to limited resources) [32, 50]. Gender of the provider may also be a determinant. Female providers navigate the same gender, age and class dynamics as their female patients and they may occupy a lower rung in the professional hierarchy; they may use mistreatment tactics to maintain their power positions [32, 50, 83].

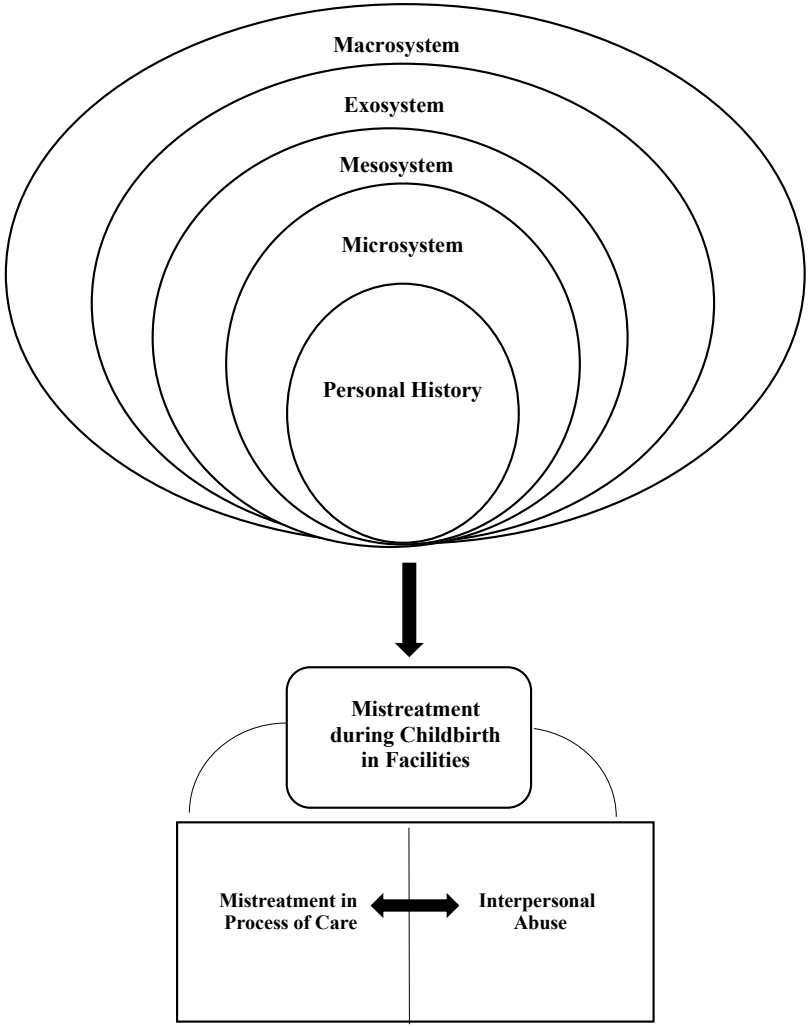
Findings from qualitative work with providers indicate that they view mistreatment as reciprocal where women also disrespect providers, which again may lead to forms of mistreatment for providers to regain control [32, 78, 79, 81, 82, 102]. The presence of a labor companion has been shown to be protective against mistreatment in some quantitative studies, though facility policies and norms around companionship vary widely [13, 48, 50, 65]. The timing of labor and delivery may also be an important determinant, where mistreatment may be more common for weekend and late night deliveries when health facility resources and oversight

may be more limited and provider fatigue or stress are greater [13, 23, 44]. Timing of mistreatment itself in the labor trajectory also influences both providers' and women's perceptions of mistreatment as problematic. When mistreatment occurs at the time of delivery, it can be seen as an acceptable and pragmatic strategy to ensure a good birth outcome; if it occurs at any other time during a facility stay, it is deemed unacceptable. Acceptability of mistreatment overall is often closely linked with whether the birth resulted in a positive outcome for both mother and baby [79-81].

Personal History

At the individual level, low education level or socioeconomic status, young age, and high parity may also contribute to a woman's risk of mistreatment. Similarly, single women and racial/ethnic or religious minorities also may be at increased risk. While these characteristics have been documented in much of the literature on mistreatment as possible contributors, very limited research documenting risk factors and the extent to which risk for overlap in different types of mistreatment varies by these factors has been conducted [13, 14, 23, 24, 44, 57, 60, 86, 100, 103, 105, 106].

Figure 2.1 Conceptual Framework for Mistreatment of Women During Childbirth



Macrosystem: Society/ Culture

- Status of women
- Gender norms
- Normalization/ Acceptance of interpersonal violence

Exosystem: Health System

- Professional norms & training
- Provider status/provider hierarchy
- Culture of the health system
- Provider-patient power dynamics
- Structure of health system^

Mesosystem: Health Facility

- Type of facility
- Competent/motivated human resources
- Facility infrastructure
- Availability of essential physical resources
- Facility culture & policies
- Actionable information systems
- Functional referral system

Microsystem: Provider- Patient Interaction

- Provider type
- Gender of provider
- Timing of labor/delivery
- Presence of labor companion

Personal History

- Education level
- Socioeconomic status
- Race/ethnicity
- Religion
- Marital status
- Age
- Parity

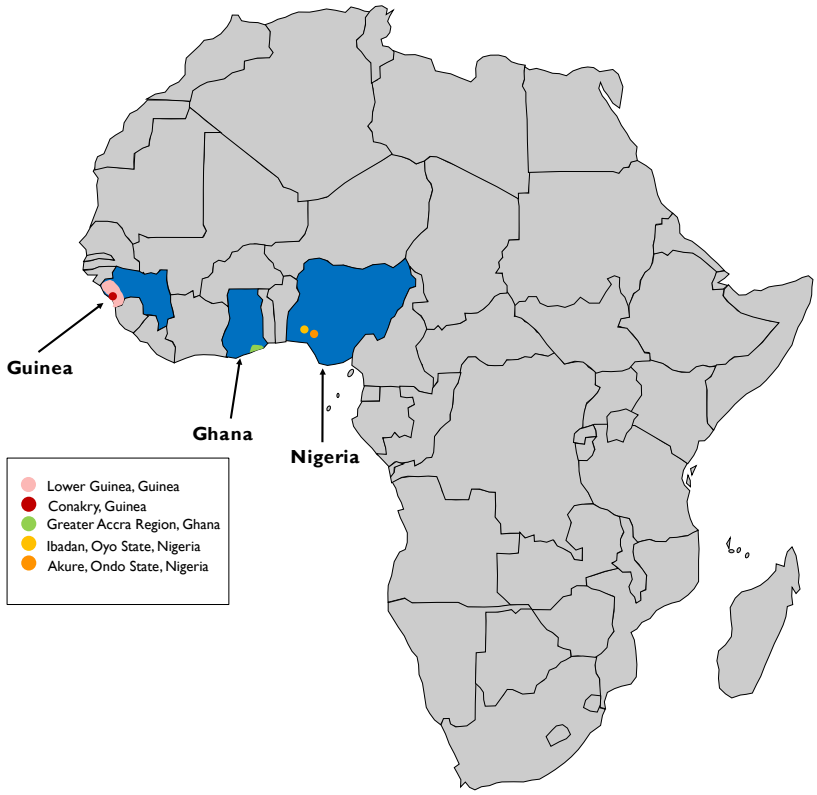
^ Includes 6 building blocks of health system: 1) service delivery, 2) Health workforce, 3) Information, 4) Medical products, vaccines, technologies
5) Financing, 6) Leadership/governance (WHO)
*Adapted from Heise (1998) and WHO Quality of Care for Pregnant Women and Newborns Framework (2015)

2.4 STUDY CONTEXTS

This research used data from a study conducted by the WHO in three countries in West Africa: Nigeria, Ghana and Guinea. As shown in **Table 2.1**, the three settings vary in demographic characteristics, health system structure, and women's health indicators, all of which contribute to different contexts for mistreatment during childbirth.

2.4.1 Nigeria

Figure 2.2 Map of Study Regions



Country Overview

Nigeria is an anglophone country in West Africa, and the most populous country in Africa with a current population of approximately 196 million [107, 108]. The country is divided into six geopolitical zones, comprised of 36 states and a Federal Capital Territory. The states are further divided into 774 local government areas (LGAs). About half of the population lives in urban areas. Southern states are significantly more densely populated than in the north [108, 109]; the northern/southern divide characterizes much of the differences in the country's population, socioeconomic and health indicators. There are over 350 ethnic groups in Nigeria, with the Fulani and Hausa the most prominent groups in the north, and the Igbo and Yoruba as the major groups in the southeast and southwest, respectively. The predominant religions are Islam (50% of the population, concentrated in the

north) and Christianity (40%, clustered in the south). The proposed research used data collected in Akure, Ondo State and Ibadan, Oyo State, both of which are in southwestern Nigeria, a majority Yoruba area (**Figure 2.2)** [109].

Overview of the Health System in Nigeria

The Nigerian health system operates under a decentralized three-tiered structure, though in practice, clarity and consistency in roles and responsibilities varies widely within the three tiers. The Federal Ministry of Health (MOH) sets national policies and priority areas, stewards national information systems, and coordinates the federal tertiary medical centers and teaching hospitals. At the state-level, MOHs in each state manage all secondary and district hospitals, as well as provide larger-scale regulation and technical support for primary health centers. Primary health centers are run by local health departments in the LGAs.

Enrollment in the Nigerian National Health Insurance Scheme (NHIS) includes free and subsidized antenatal and maternity care for up to four births, but most recent estimates show that NHIS coverage is low, 3.5% of the population; most Nigerians pay high out-of-pocket fees for healthcare [109-111]. There are significant disparities between geographic zones and urban and rural regions within zones in the availability and capacity of health workers as well as technical resources. Nationally, the density of doctors, nurses, and midwives is 20 per 10,000 population, just below the WHO's critical threshold of 23 per 10,000 to adequately deliver essential maternal and newborn health services. The highest density healthcare personnel are in the southern states [112, 113]. In an effort to increase access to skilled birth attendants (SBAs), the federal government initiated the Midwives Service Scheme and Subsidy Reinvestment and Empowerment Program, Maternal and Child Health (SURE-P-MCH) in 2012 to train and deploy

cadres of midwives and community health extension workers to primary healthcare centers around the country [109].

Women's Health in Nigeria

Nigeria has a high Total Fertility Rate (TFR) of 5.3, and only 17% of married women of reproductive age (aged 15-49 years) use a method contraception[114] . Nigeria has consistently had among the worst maternal health indicators in the world; in 2015 it accounted for 19% of all maternal deaths worldwide, had one of the highest MMRs in the world at 814 (UI 80%: 596-1180) per 100,000 live births, and had a 1 in 22 lifetime risk of maternal death [18, 115]. While about 67% of women have at least one antenatal visit and just over half have at least 4 visits, only 43% of deliveries are assisted by a skilled provider. Use of facilities during delivery is also low, with only 39% of births in a health facility; the Demographic and Health Survey (DHS) shows the rate of facility-based births remained relatively unchanged between 2008-2018 [109, 114]. Facility deliveries are significantly higher in the states in which WHO data for this study were collected (80.7% and 70.1% in Ondo and Oyo States, respectively) [109, 114].

Large differences in maternal health service use exist between geographic zones, socioeconomic quintiles, and urban/ rural areas [18, 109]. Previous research on maternal healthcare use in Nigeria indicates low satisfaction with care across the maternity continuum, with poor staff attitudes, long wait times, poor attention paid during delivery, and sub-standard facilities as important deterrents of facility-based childbirth [116-119]. According to the DHS, 16.5% of women cited a reason for not accessing a facility for childbirth was the poor attitudes of healthcare workers; this same reason was cited among 4.4% of women in Ondo State versus 28.0% in Oyo State [109].

Experience and acceptability of violence against women are pervasive in Nigeria across socioeconomic, ethnic, and urban/rural groups. Nearly 3 in 10 women of reproductive age report ever experiencing physical violence (44% and 48% in Ondo and Oyo States, respectively), and 11% report experiencing it in the last 12 months (20.6% in Ondo and 16.1% in Oyo) [109]. About 5% of women report they experienced physical violence during pregnancy. Less than a third of women who ever experienced violence have disclosed the experience to someone or sought help to address it [109]. Acceptability of using violence to punish women is prevalent, with 35% of women (34% in Ondo, 20.1% in Oyo) and a quarter of men (22% in Ondo, 12.3% in Oyo) agreeing that wife beating was justified in at least one of the following scenarios: burning food, neglecting the children, arguing with the husband, and refusing to have sexual intercourse [109]

A few studies on mistreatment and perceptions of maternity care have been conducted in Nigeria. The results of a study in southeastern Nigeria showed that mistreatment was prevalent and normalized in a state teaching hospital, with 98% of women experiencing at least one kind of mistreatment, over half of the sample experiencing non-consented care, and over a third experiencing physical abuse, particularly during the second stage of labor [48]. A study in southwest Nigeria found 19% of women had experienced mistreatment, including non-dignified care, discrimination, detainment, and abandonment [55]. Findings from qualitative work in Abuja, Nigeria as part of the WHO Study on How Women are Treated During Childbirth showed that both women and providers witnessed or experienced a wide range of mistreatment; mistreatment was often seen as acceptable to achieve good health outcomes and often viewed as the woman's fault [78, 79].

2.4.2 Ghana

Country Overview

Ghana, also an English-speaking country in West Africa, has a population of 29.5 million [108]. It is divided into 10 major administrative areas, though half of the population is clustered in three areas, Ashanti, Easter, and Greater Accra. The administrative areas further divide into 216 districts; just over half of the population lives in urban areas. The main ethnic groups are the Akans (48%), the Mole-Dagbani (17%), the Ewe (14%), and the Ga-Dangme (7%). The predominant religions are Christianity (over 70%) and Islam (17.6%, concentrated in the northern regions) [108, 120, 121]. The proposed research used data collected in the Greater Accra region, which although geographically the smallest of the administrative areas, has about 4.6 million inhabitants (16% of the country's total population), and is the most urbanized area in the country with 87% living in urban centers **(Figure 2.2)** [121].

Overview of the Health System in Ghana

Ghana has a decentralized health system, coordinated at the regional (regional hospitals and public health service coordination), district (district hospital administration) and sub-district levels (coordinates primary health services, often the first point-of-contact for midwifery and reproductive health services) [122]. A collaborative between the Ghana Health Service under the federal MOH, universities, and the districts coordinates tertiary teaching hospitals. Nearly a fifth of facilities that provide maternal and reproductive health services are private maternity homes run by the Ghana Registered Midwives Association and the Reproductive and Child Health Unit of the Ghana Health Service [122].

Ghana was the first country in sub-Saharan Africa to implement a large-scale social insurance program to move towards universal health coverage through the National Health

Insurance Scheme (NHIS), which actively covers 40% of the population [123]. In a national effort to increase equity in access to maternal health services and facility-based deliveries, the Free Maternal Health Care Initiative was launched in 2008. It replaced a fee-for-service system and provided fully subsidized insurance to pregnant women through the NHIS, covering comprehensive maternity care and strengthening infrastructure, human resources, and equipment in facilities [123, 124]. Formal evaluations of this initiative showed that since 2008, antenatal care coverage and facility deliveries increased and institutional maternal mortality decreased, but implementation of the program varies widely by region, with a lack of healthcare personnel cited as the most significant barrier to implementation [124, 125]. The density of healthcare personnel is 11 per 10,000 population, far below the WHO critical threshold of 23 per 10,000, and providers are clustered in teaching and private facilities in urban areas [123].

Women's Health in Ghana

While Ghana has a comparatively low TFR for the region at 3.9, only a quarter of women of reproductive age use a method of contraception [126]. Ghana achieved close to a 50% reduction in MMR during the MDG era and has a current MMR of 319 (UI 80%: 216-458) per 100,000 live births[1]. Nearly all (98%) women have at least one antenatal care visit from a skilled provider, and the vast majority (89%) have at least 4 visits [126].

The majority of births are attended by a skilled provider, and 79% occur in a health facility, about two-thirds (67.5%) of which are in public facilities [126]. Ghana has shown a marked increase in facility deliveries by about 30% over the last 15 years, but large disparities remain in facility delivery by geographic zone and socioeconomic level [120]. While percentages vary by administrative area, over 60% of deliveries are attended by a nurse/midwife, 16% are delivered by a doctor, and 9% are attended by a traditional birth attendant [126].

Facility-based birth in the Greater Accra region is the highest in the country at 92%; a quarter of deliveries are attended by a doctor while two-thirds are attended by a nurse/midwife. The percent of Cesarean deliveries are also significantly higher in Greater Accra at 24% compared to the national average of 16%[126]. Quantitative and qualitative research about women's use, perceptions and satisfaction with maternity care in southern Ghana underscore that interpersonal aspects of care, including staff attitudes, emotional support and connection, and professional, respectful care are critical determinants of women's satisfaction with their birth experience. These studies also found that women avoid facilities where they experience disrespectful care during future care-seeking, and warn their social networks about these facilities [96, 127, 128].

Gender-based violence is highly prevalent in Ghana as over 42% of women report ever experiencing physical violence, and 9% report at least one experience in the last 12 months (in the Greater Accra region, these estimates are slightly lower at 30% and 6%, respectively). Prevalence of sexual violence is also high with 30% of women reporting lifetime experience and nearly 11% experience in the last year (Greater Accra: 28% and 11.5%, respectively) [129]. Social norms and attitudes around violence against women indicate that violence is a common way to resolve disputes, and blaming women for the violence they experience is pervasive. While wife-beating is generally seen as negative, 30% of women and 13% of men agree it is justified in at least one scenario, and 50% agree that the resulting violence is the woman's fault or something she deserved [120, 129].

Four studies were identified on mistreatment during childbirth in Ghana. A multi-country analysis of person-centered maternity care by Afulani et al. documented a majority of women in the sample from Ghana were not informed about procedures or medications received, did not give consent for procedures they received, and did not feel they were able to ask questions or be

involved with their own care [52]. In a qualitative study in northern Ghana, women, providers, and community members all reported that while maternity care is generally positive, mistreatment is also common, impacts low-income women in particular and may dissuade women from seeking care for future deliveries. All participants reported experiencing or witnessing physical or verbal abuse, neglect, discrimination, and denial of traditional practices during childbirth. Providers also reported very poor working conditions and facility infrastructure, long working hours, and extreme power hierarchies between providers in facilities [103].

In a mixed-methods study of midwifery students' exposure to mistreatment, three-quarters of students said mistreatment is a large issue throughout Ghana, and that they often witnessed it during their training to get women to cooperate during labor. They reported that private facilities tended to practice more respectful care, and high-income women tended to receive more dignified care [32, 130]. The results of a qualitative study from the formative phase of the WHO Multi-Country Study on How Women are Treated during Childbirth indicated that women reported physical and verbal abuse, abandonment, and lack of support during birth. Women noted that abuse was particularly common during the second stage of labor, especially among adolescents, often as a response to the woman's inability to push, disobeying instructions, or for failing to bring their own "mama kit," or safe delivery items. Women indicated they would likely avoid certain facilities based on either personal experiences of mistreatment or hearing about others' experiences [131].

2.4.3 Guinea

Country Overview

Guinea, a francophone country in West Africa, has 11.9 million inhabitants across 7 administrative regions, further divided into 33 prefectures [108, 132]. Only 35% of the population lives in urban areas and two–thirds are illiterate [108, 132]. There are several ethnic groups in Guinea, with the major groups including: Soussou, Malinké, Peul, Kissi, Toma, and Guerzé. It is a majority Muslim country (87%). Guinea was the origin country of the 2014-15 Ebola outbreak, and had over 3,300 confirmed cases and about 2,500 deaths as of 2015 [133]. This study used data from the Lower (Maritime) Guinea region, which includes Conakry, the capital and largest city with 15% of the country's population **(Figure 2.2)** [132].

Overview of the Health System in Guinea

Guinea's health system has recently undergone decentralization [132]. The Ministry of Health and Public Hygiene coordinates health services of tertiary-level public facilities, while administrative areas manage district hospitals and prefectures coordinate prefecture/primary health centers. Non-public health facilities are administrated by the private and denominational sectors [132]. As part of Guinea's most recent health system reform, several aspects of maternal and reproductive health were highlighted for systems strengthening. Free maternity care is covered across the continuum, including antenatal care and delivery care (including Cesarean deliveries). Post-abortion care was integrated into district and prefecture hospitals, community-based distribution programs for family planning were established, and reproductive health education was reassessed and strengthened in provider training programs [132].

Despite these changes, low technical capacity and severe healthcare personnel shortages remain significant issues hindering efforts to increase quality of maternal health services [134,

135]. It is estimated that Guinea has only 30% of the recommended minimum healthcare workforce capacity to deliver essential and emergency obstetric care. The most recent data indicates only a few hundred nurses, general practice doctors, and obstetrician/gynecologists to cover the population [135]. Post-hoc assessments documented significant compromises on all facets of the Guinean health system as a result of the Ebola outbreak, including mass reductions in healthcare personnel and material resources, heightened fear of utilizing the formal health sector, and as much as an 80% reduction in the use of facilities for delivery in areas most impacted by the epidemic [136].

Women's Health in Guinea

Guinea is a high fertility country (TFR of 4.8) with a very low level of contraceptive use (11% of married women of reproductive age report using a method) [137]. There was a 35% reduction in maternal mortality over the last 25 years, but Guinea remains one of the highest burdened countries in West Africa with an MMR of 679 (UI 80%: 504-927); maternal mortality still accounts for 28% of all deaths among women of reproductive age [1, 108, 115]. Antenatal care coverage is relatively high (81% of women have at least one visit, 35% have four or more visits), but only 55% of births are assisted by a skilled provider and about half (53%) of births occur in facilities [137]. Lower Guinea has a similar facility delivery prevalence to the national average (39%, 35% of which occur in public facilities), but the vast majority (90%) of births in Conakry occur in facilities (60% of which are in public facilities) [132, 137].There has been about a 20% increase in facility deliveries over the last 15 years [137]. Most facility births (60%) are attended by midwives, and less than 10% are attended by doctors (much higher in Conakry, 33%) [132]. Cesarean delivery rates are low in the country, only accounting for about 2% of deliveries (7% in Conakry) [132].

Violence against women is pervasive in Guinea. Ninety-two percent of women of reproductive age report ever experiencing some kind of violence, and 40%, at least one violent experience in the last 12 months[138]. Two-thirds of men and 92% of women agree that wife beating is justified in at least one of the following scenarios: burning food, neglecting the children, arguing with the husband, and refusing to have sexual intercourse[132]. Female genital cutting is nearly universal in Guinea (97%) and Lower Guinea (99%; 96.5% in Conakry). There is some variation in genital cutting by ethnic group; nearly all Muslim women and 80% of Christian women have undergone genital cutting [132].

Only one qualitative study was identified on mistreatment in Guinea, results from formative research for the larger WHO study in which this research is embedded. The study assessed perceptions, experiences and acceptability of mistreatment among women, providers, and facility administrators. Women reported experiencing physical and verbal abuse as well as giving birth on the floor without a healthcare provider. Providers noted that very limited resources and poor working conditions contribute to a high-risk environment for mistreatment. Acceptability of mistreatment to gain control and compliance was tied to: 1) stage of labor in which it occurred, and 2) whether the mother and infant had healthy birth outcomes [80, 81].

Table 2.1 Population, Maternal, and Gender-Based Violence Indicators in Study Settings

Country	Nigeria[a]	Ghana[b]	Guinea[c]
Population (in millions)[d]	195.9	29.5	11.9
Total Fertility Rate	5.3	3.9	4.8
Maternal Mortality Rate (UI 80%)[e]	814 (596-1180)	319 (216-458)	679 (504-927)
% Skilled birth attendance	43%	79%	55%
% Facility births	39%	79%	53%
% Women experienced physical violence in past 12 months	11%[f]	9%[g]	40%[h]
Number of previous mistreatment studies conducted in setting	3	4	1

Table 2.1

Abbreviations: UI= uncertainty interval [a]Unless otherwise noted, data source: Demographic and Health Survey Key Indicators Report, Nigeria 2018[114]. [b]Unless otherwise noted, data source: Ghana Maternal Health Survey (DHS) 2017 [126]. [c]Unless otherwise noted, data source: Demographic and Health Survey Key Indicators Report, Guinea 2018[137]. [d] Data source: Population Reference Bureau, 2018 [108].[e] Data source: Alkema et al. (2016) [1]. [f] Data source: Demographic and Health Survey, Nigeria 2013 [109]. [g]Data source: Demographic and Health Survey, Ghana 2014 [120]. [h]Data source: Demographic and Health Survey, Guinea 2012 [132]

2.5 REFERENCES

1. Alkema, L., et al., *Global, regional, and national levels and trends in maternal mortality between 1990 and 2015, with scenario-based projections to 2030: a systematic analysis by the UN Maternal Mortality Estimation Inter-Agency Group.* The Lancet, 2016. **387**(10017): p. 462-474.
2. United Nations, *The Millenium Development Goals Report 2014* UNICEF, Editor. 2014: New York.
3. United Nations Department of Economic and Social Affairs. *"Sustainable Development Goals."*. Sustainable Development Knowledge Platform. 2015.
4. Bohren, M.A., et al., *Facilitators and barriers to facility-based delivery in low-and middle-income countries: a qualitative evidence synthesis.* Reproductive health, 2014. **11**(1): p. 71.
5. Bowser, D. and K. Hill, *Exploring evidence for disrespect and abuse in facility-based childbirth.* Boston: USAID-TRAction Project, Harvard School of Public Health, 2010.

6. Hulton, L., et al., *Using evidence to drive action: A "revolution in accountability" to implement quality care for better maternal and newborn health in Africa.* International journal of gynecology & obstetrics, 2014. **127**(1): p. 96-101.
7. Renfrew, M.J., et al., *Midwifery and quality care: findings from a new evidence-informed framework for maternal and newborn care.* The Lancet, 2014. **384**(9948): p. 1129-1145.
8. Kruk, M.E., et al., *Women's preferences for place of delivery in rural Tanzania: a population-based discrete choice experiment.* American journal of public health, 2009. **99**(9): p. 1666-1672.
9. Sawyer, A., et al., *Measures of satisfaction with care during labour and birth: a comparative review.* BMC pregnancy and childbirth, 2013. **13**(1): p. 108.
10. Hodnett, E.D., *Pain and women's satisfaction with the experience of childbirth: a systematic review.* American journal of obstetrics and gynecology, 2002. **186**(5): p. S160-S172.
11. Gabrysch, S. and O.M. Campbell, *Still too far to walk: literature review of the determinants of delivery service use.* BMC pregnancy and childbirth, 2009. **9**(1): p. 34.
12. UNICEF, *The State of the World's Children 2016: A Fair Change for Every Child*. 2016.
13. Souza, J.P., et al., *Moving beyond essential interventions for reduction of maternal mortality (the WHO Multicountry Survey on Maternal and Newborn Health): a cross-sectional study.* The Lancet, 2013. **381**(9879): p. 1747-1755.
14. Bohren, M.A., et al., *The mistreatment of women during childbirth in health facilities globally: a mixed-methods systematic review.* PLoS medicine, 2015. **12**(6): p. e1001847.
15. Thaddeus, S. and D. Maine, *Too far to walk: maternal mortality in context.* Social science & medicine, 1994. **38**(8): p. 1091-1110.
16. Miller, S., et al., *Beyond too little, too late and too much, too soon: a pathway towards evidence-based, respectful maternity care worldwide.* The Lancet, 2016. **388**(10056): p. 2176-2192.
17. Tunçalp, Ö., et al., *Quality of care for pregnant women and newborns—the WHO vision.* BJOG: an international journal of obstetrics & gynaecology, 2015. **122**(8): p. 1045-1049.
18. Sudhinaraset, M., et al., *Decision-making for delivery location and quality of care among slum-dwellers: a qualitative study in Uttar Pradesh, India.* BMC pregnancy and childbirth, 2016. **16**(1): p. 148.
19. Mselle, L.T., et al., *Why give birth in health facility? Users' and providers' accounts of poor quality of birth care in Tanzania.* BMC health services research, 2013. **13**(1): p. 174.
20. Nilver, H.A.-O.h.o.o., C. Begley, and M. Berg, *Measuring women's childbirth experiences: a systematic review for identification and analysis of validated instruments.* (1471-2393 (Electronic)).
21. Bradley, S., et al., *Disrespectful intrapartum care during facility-based delivery in sub-Saharan Africa: A qualitative systematic review and thematic synthesis of women's perceptions and experiences.* Social Science & Medicine, 2016. **169**: p. 157-170.
22. Ishola, F., O. Owolabi, and V. Filippi, *Disrespect and abuse of women during childbirth in Nigeria: A systematic review.* PloS one, 2017. **12**(3): p. e0174084.
23. Igboanugo, G.M. and C.H. Martin, *What are pregnant women in a rural Niger Delta community's perceptions of conventional maternity service provision? An exploratory qualitative study.* African journal of reproductive health, 2011. **15**(3): p. 63-77.

24. O'Donnell, E., et al., *'At the right time, in the right way, with the right resources': perceptions of the quality of care provided during childbirth in Malawi.* BMC pregnancy and childbirth, 2014. **14**(1): p. 248.
25. Freedman, L.P., et al., *Defining disrespect and abuse of women in childbirth: a research, policy and rights agenda.* Bulletin of the World Health Organization, 2014. **92**(12): p. 915-917.
26. Ashimi, A.O. and T.G. Amole, *Prevalence, reasons and predictors for home births among pregnant women attending antenatal care in Birnin Kudu, North-west Nigeria.* Sexual & Reproductive Healthcare, 2015. **6**(3): p. 119-125.
27. Srivastava, A., et al., *Determinants of women's satisfaction with maternal health care: a review of literature from developing countries.* BMC pregnancy and childbirth, 2015. **15**(1): p. 97.
28. Brizuela, V., et al., *Measuring quality of care for all women and newborns: how do we know if we are doing it right? A review of facility assessment tools.* Lancet Glob Health, 2019. **7**(5): p. e624-e632.
29. Kruk, M.E., et al., *High-quality health systems in the Sustainable Development Goals era: time for a revolution.* Lancet Glob Health, 2018. **6**(11): p. e1196-e1252.
30. Abuya, T., et al., *Exploring the prevalence of disrespect and abuse during childbirth in Kenya.* PLoS One, 2015. **10**(4): p. e0123606.
31. Rominski, S.D., et al., *When the baby remains there for a long time, it is going to die so you have to hit her small for the baby to come out: justification of disrespectful and abusive care during childbirth among midwifery students in Ghana.* Health policy and planning, 2017. **32**(2): p. 215-224.
32. McMahon, S.A., et al., *Experiences of and responses to disrespectful maternity care and abuse during childbirth; a qualitative study with women and men in Morogoro Region, Tanzania.* BMC Pregnancy and Childbirth, 2014. **14**(1): p. 268.
33. Miller, S. and A. Lalonde, *The global epidemic of abuse and disrespect during childbirth: History, evidence, interventions, and FIGO's mother− baby friendly birthing facilities initiative.* International Journal of Gynecology & Obstetrics, 2015. **131**(S1).
34. d'Oliveira, A.F.P.L., S.G. Diniz, and L.B. Schraiber, *Violence against women in health-care institutions: an emerging problem.* The Lancet, 2002. **359**(9318): p. 1681-1685.
35. Miller, S., et al., *Quality of care in institutionalized deliveries: the paradox of the Dominican Republic.* International Journal of Gynecology & Obstetrics, 2003. **82**(1): p. 89-103.
36. Reis, V., et al., *Respectful maternity care.* Maternal and Child Health Integrated Program (MCHIP), Washington, DC, 2012.
37. Sadler, M., et al., *Moving beyond disrespect and abuse: addressing the structural dimensions of obstetric violence.* Reproductive health matters, 2016. **24**(47): p. 47-55.
38. Vacaflor, C.H., *Obstetric violence: a new framework for identifying challenges to maternal healthcare in Argentina.* Reproductive health matters, 2016. **24**(47): p. 65-73.
39. Chattopadhyay, S., A. Mishra, and S. Jacob, *'Safe', yet violent? Women's experiences with obstetric violence during hospital births in rural Northeast India.* Culture health and sexuality, 2017.
40. World Health Organization, *The prevention and elimination of disrespect and abuse during facility-based childbirth: WHO statement.* 2014.

41. Khosla, R., et al., *International human rights and the mistreatment of women during childbirth.* Health and Human Rights, 2016. **18**(2): p. 131.
42. Vogel, J.P., et al., *Promoting respect and preventing mistreatment during childbirth.* BJOG, 2016. **123**(5): p. 671-4.
43. White Ribbon Alliance, *Respectful maternity care: the universal rights of childbearing women.* White Ribbon Alliance, 2011.
44. Molina, R.L., et al., *Striving for Respectful Maternity Care Everywhere.* Maternal and child health journal, 2016. **20**(9): p. 1769-1773.
45. Sethi, R.A.-O.h.o.o., et al., *The prevalence of disrespect and abuse during facility-based maternity care in Malawi: evidence from direct observations of labor and delivery.* (1742-4755 (Electronic)).
46. Sando, D., et al., *The prevalence of disrespect and abuse during facility-based childbirth in urban Tanzania.* BMC pregnancy and childbirth, 2016. **16**(1): p. 236.
47. Raj, A., et al., *Associations Between Mistreatment by a Provider during Childbirth and Maternal Health Complications in Uttar Pradesh, India. LID - 10.1007/s10995-017-2298-8 [doi]*. (1573-6628 (Electronic)).
48. Okafor, I.I., E.O. Ugwu, and S.N. Obi, *Disrespect and abuse during facility-based childbirth in a low-income country.* International Journal of Gynecology & Obstetrics, 2015. **128**(2): p. 110-113.
49. Kujawski, S., et al., *Association between disrespect and abuse during childbirth and women's confidence in health facilities in Tanzania.* Maternal and child health journal, 2015. **19**(10): p. 2243.
50. Sheferaw, E.D., et al., *Respectful maternity care in Ethiopian public health facilities.* Reproductive Health, 2017. **14**(1): p. 60.
51. Abuya, T., et al., *Measuring mistreatment of women throughout the birthing process: implications for quality of care assessments.* Reprod Health Matters, 2018. **26**(53): p. 48-61.
52. Afulani, P.A., et al., *Person-centred maternity care in low-income and middle-income countries: analysis of data from Kenya, Ghana, and India.* Lancet Glob Health, 2019. **7**(1): p. e96-e109.
53. Bishanga, D.R., et al., *Women's Experience of Facility-Based Childbirth Care and Receipt of an Early Postnatal Check for Herself and Her Newborn in Northwestern Tanzania.* Int J Environ Res Public Health, 2019. **16**(3).
54. Bobo, F.T., et al., *Disrespect and abuse during childbirth in Western Ethiopia: Should women continue to tolerate?* PloS one, 2019. **14**(6): p. e0217126.
55. Ijadunola, M.Y., et al., *Lifting the veil on disrespect and abuse in facility-based child birth care: findings from South West Nigeria.* BMC Pregnancy Childbirth, 2019. **19**(1): p. 39.
56. Vedam, S., et al., *Patient-led decision making: Measuring autonomy and respect in Canadian maternity care.* Patient Educ Couns, 2019. **102**(3): p. 586-594.
57. Morton, C.H., et al., *Bearing witness: United States and Canadian maternity support workers' observations of disrespectful care in childbirth.* Birth, 2018. **45**(3): p. 263-274.
58. Sando, D., et al., *Methods used in prevalence studies of disrespect and abuse during facility based childbirth: lessons learned.* Reproductive Health, 2017. **14**(1): p. 127.

59. Sharma, G., et al., *An investigation into mistreatment of women during labour and childbirth in maternity care facilities in Uttar Pradesh, India: a mixed methods study.* Reprod Health, 2019. **16**(1): p. 7.
60. Kruk, M.E., et al., *Disrespectful and abusive treatment during facility delivery in Tanzania: a facility and community survey.* Health Policy and Planning, 2014: p. czu079.
61. Sheferaw, E.D., T.Z. Mengesha, and S.B. Wase, *Development of a tool to measure women's perception of respectful maternity care in public health facilities.* BMC pregnancy and childbirth, 2016. **16**(1): p. 67.
62. Sando, D., et al., *Disrespect and abuse during childbirth in Tanzania: are women living with HIV more vulnerable?* Journal of acquired immune deficiency syndromes (1999), 2014. **67**(Suppl 4): p. S228.
63. Ratcliffe, H.L., et al., *Applying a participatory approach to the promotion of a culture of respect during childbirth.* Reproductive health, 2016. **13**(1): p. 80.
64. Warren, C., et al., *Study protocol for promoting respectful maternity care initiative to assess, measure and design interventions to reduce disrespect and abuse during childbirth in Kenya.* BMC Pregnancy and Childbirth, 2013. **13**(1): p. 21.
65. Abuya, T., et al., *The effect of a multi-component intervention on disrespect and abuse during childbirth in Kenya.* BMC pregnancy and childbirth, 2015. **15**(1): p. 224.
66. Jhpiego, *Respectful Maternity Care*, Jhpiego, Editor. 2016.
67. Ratcliffe, H.L., et al., *Mitigating disrespect and abuse during childbirth in Tanzania: an exploratory study of the effects of two facility-based interventions in a large public hospital.* Reproductive health, 2016. **13**(1): p. 79.
68. Asefa, A. and D. Bekele, *Status of respectful and non-abusive care during facility-based childbirth in a hospital and health centers in Addis Ababa, Ethiopia.* Reproductive health, 2015. **12**(1): p. 33.
69. Rosen, H.E., et al., *Direct observation of respectful maternity care in five countries: a cross-sectional study of health facilities in East and Southern Africa.* BMC pregnancy and childbirth, 2015. **15**(1): p. 306.
70. Ellsberg, M. and L. Heise. *2005: Researching Violence Against Women. A Practical Guide for Researchers and Activists*. in *by World Health Organization (WHO), Geneva. See also: www. path. org/files/GBV_rvaw_complete. pdf Marie-France Hirigoyen, 2006: Warum tust du mir das an? Gewalt in Partnerschaften*. 2005. Citeseer.
71. Ansara, D.L. and M.J. Hindin, *Exploring gender differences in the patterns of intimate partner violence in Canada: a latent class approach.* Journal of Epidemiology & Community Health, 2010. **64**(10): p. 849-854.
72. Straus, M.A., *Measuring intrafamily conflict and violence: The conflict tactics (CT) scales.* Journal of Marriage and the Family, 1979: p. 75-88.
73. Straus, M.A., et al., *The revised conflict tactics scales (CTS2) development and preliminary psychometric data.* Journal of family issues, 1996. **17**(3): p. 283-316.
74. Hindin, M.J., *Understanding women's attitudes towards wife beating in Zimbabwe.* Bulletin of the World Health Organization, 2003. **81**(7): p. 501-508.
75. Afulani, P.A., et al., *Development of a tool to measure person-centered maternity care in developing settings: validation in a rural and urban Kenyan population.* Reprod Health, 2017. **14**(1): p. 118.
76. Afulani, P.A., et al., *Validation of the person-centered maternity care scale in India.* Reprod Health, 2018. **15**(1): p. 147.

77. Afulani, P.A., et al., *Toward the development of a short multi-country person-centered maternity care scale.* Int J Gynaecol Obstet, 2019. **146**(1): p. 80-87.
78. Bohren, M.A., et al., *Mistreatment of women during childbirth in Abuja, Nigeria: a qualitative study on perceptions and experiences of women and healthcare providers.* Reproductive health, 2017. **14**(1): p. 9.
79. Bohren, M.A., et al., *"By slapping their laps, the patient will know that you truly care for her": A qualitative study on social norms and acceptability of the mistreatment of women during childbirth in Abuja, Nigeria.* SSM-Population Health, 2016. **2**: p. 640-655.
80. Balde, M.D., et al., *Perceptions and experiences of the mistreatment of women during childbirth in health facilities in Guinea: A qualitative study with women and service providers.* Reproductive health, 2017. **14**(1): p. 3.
81. Balde, M.D., et al., *A qualitative study of women's and health providers' attitudes and acceptability of mistreatment during childbirth in health facilities in Guinea.* Reproductive health, 2017. **14**(1): p. 4.
82. Burrowes, S., et al., *Midwives' and patients' perspectives on disrespect and abuse during labor and delivery care in Ethiopia: a qualitative study.* BMC Pregnancy and Childbirth, 2017. **17**(1): p. 263.
83. Jewkes, R. and L. Penn-Kekana, *Mistreatment of women in childbirth: time for action on this important dimension of violence against women.* PLoS medicine, 2015. **12**(6): p. e1001849.
84. Ndwiga, C., et al., *Exploring provider perspectives on respectful maternity care in Kenya:"Work with what you have".* Reproductive Health, 2017. **14**(1): p. 99.
85. Ouédraogo, A., et al., *Respectful maternity care in three health facilities in Burkina Faso: The experience of the Society of Gynaecologists and Obstetricians of Burkina Faso.* International Journal of Gynecology & Obstetrics, 2014. **127**(S1).
86. Sudhinaraset, M., et al., *Women's status and experiences of mistreatment during childbirth in Uttar Pradesh: a mixed methods study using cultural health capital theory.* BMC pregnancy and childbirth, 2016. **16**(1): p. 332.
87. Misago, C., et al., *From 'culture of dehumanization of childbirth' to 'childbirth as a transformative experience': changes in five municipalities in north-east Brazil.* Int J Gynaecol Obstet, 2001. **75**.
88. Stankovic, B., *Women's Experiences of Childbirth in Serbian Public Healthcare Institutions: a Qualitative Study.* International Journal of Behavioral Medicine, 2017: p. 1-12.
89. Wilunda, C., et al., *Barriers to Institutional Childbirth in Rumbek North County, South Sudan: A Qualitative Study.* PloS one, 2016. **11**(12): p. e0168083.
90. Higginbottom, G.M., et al., *An ethnographic investigation of the maternity healthcare experience of immigrants in rural and urban Alberta, Canada.* BMC pregnancy and childbirth, 2016. **16**(1): p. 20.
91. Jomeen, J. and M. Redshaw, *Ethnic minority women's experience of maternity services in England.* Ethnicity & health, 2013. **18**(3): p. 280-296.
92. Vedam, S., et al., *The Mothers on Respect (MOR) index: measuring quality, safety, and human rights in childbirth.* SSM Popul Health, 2017. **3**: p. 201-210.
93. Vedam, S., et al., *The Giving Voice to Mothers study: inequity and mistreatment during pregnancy and childbirth in the United States.* Reprod Health, 2019. **16**(1): p. 77.

94. Andersen, H.M., *"Villagers": differential treatment in a Ghanaian hospital.* Social Science & Medicine, 2004. **59**(10): p. 2003-2012.
95. Amoakohene, M.I., *Violence against women in Ghana: a look at women's perceptions and review of policy and social responses.* Social Science & Medicine, 2004. **59**(11): p. 2373-2385.
96. d'Ambruoso, L., M. Abbey, and J. Hussein, *Please understand when I cry out in pain: women's accounts of maternity services during labour and delivery in Ghana.* BMC public health, 2005. **5**(1): p. 140.
97. Mensah, R., R. Mogale, and M. Richter, *Birthing experiences of Ghanaian women in 37th Military Hospital, Accra, Ghana.* International Journal of Africa Nursing Sciences, 2014. **1**: p. 29-34.
98. Silveira, M.F., et al., *The association between disrespect and abuse of women during childbirth and postpartum depression: Findings from the 2015 Pelotas birth cohort study.* J Affect Disord, 2019. **256**: p. 441-447.
99. Heise, L.L., *Violence against women: an integrated, ecological framework.* Violence against women, 1998. **4**(3): p. 262-290.
100. Jewkes, R., N. Abrahams, and Z. Mvo, *Why do nurses abuse patients? Reflections from South African obstetric services.* Social science & medicine, 1998. **47**(11): p. 1781-1795.
101. Warren, N., et al., *Nègènègèn: Sweet talk, disrespect, and abuse among rural auxiliary midwives in Mali.* Midwifery, 2015. **31**(11): p. 1073-1080.
102. Kruger, L.M. and C. Schoombee, *The other side of caring: abuse in a South African maternity ward.* Journal of Reproductive and Infant Psychology, 2010. **28**(1): p. 84-101.
103. Moyer, C.A., et al., *'They treat you like you are not a human being': maltreatment during labour and delivery in rural northern Ghana.* Midwifery, 2014. **30**(2): p. 262-268.
104. Alexander, A., et al., *Social support during delivery in Rural Central Ghana: A mixed methods study of women's preferences for and against inclusion of a lay companion in the delivery room.* Journal of biosocial science, 2014. **46**(5): p. 669-685.
105. Amroussia, N., et al., *"Is the doctor God to punish me?!" An intersectional examination of disrespectful and abusive care during childbirth against single mothers in Tunisia.* Reproductive health, 2017. **14**(1): p. 32.
106. Afulani, P.A., T.S. Sayi, and D. Montagu, *Predictors of person-centered maternity care: the role of socioeconomic status, empowerment, and facility type.* BMC Health Serv Res, 2018. **18**(1): p. 360.
107. World Bank. *The World Bank: Nigeria* 2019; Available from: https://www.worldbank.org/en/country/nigeria/overview.
108. Population Reference Bureau, *2018 World Population Data Sheet*. 2018, Population Reference Bureau Washington, DC.
109. National Population Commission - NPC/Nigeria and ICF International, *Nigeria Demographic and Health Survey 2013*. 2014, NPC/Nigeria and ICF International: Abuja, Nigeria.
110. Lawani, L.O., et al., *Obstetric benefits of health insurance: A comparative analysis of obstetric indices and outcome of enrollees and non-enrollees in southeast Nigeria.* Journal of Obstetrics and Gynaecology, 2016. **36**(7): p. 946-949.
111. Odeyemi, I. and J. Nixon, *Assessing equity in health care through the national health insurance schemes of Nigeria and Ghana: a review-based comparative analysis.* International journal for equity in health, 2013. **12**(1): p. 9.

112. World Health Organization, *Primary health care systems (PRIMASYS): a case study from Nigeria.*, in *PRIMASYS* World Health Organization, Editor. 2017: Geneva.
113. Macro, I. and N.P. Commission, *Nigeria demographic and health survey 2008.* Abuja, Nigeria: National Population Commission and ICF Macro, 2009.
114. National Popluation Commission (NPC) [Nigeria] and ICF, *Nigeria Demographic and Health Survey 2018 Key Indicators* 2018, NPC and ICF: Abuja, Nigeria and Rockville, Maryland, USA.
115. WHO and UNICEF, *Trends in maternal mortality: 1990-2015: estimates from WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division.* 2015.
116. Okonofua, F., et al., *Qualitative assessment of women's satisfaction with maternal health care in referral hospitals in Nigeria.* Reproductive health, 2017. **14**(1): p. 44.
117. Okonofua, F., et al., *Maternal death review and outcomes: An assessment in Lagos State, Nigeria.* PloS one, 2017. **12**(12): p. e0188392.
118. Babalola, S. and A. Fatusi, *Determinants of use of maternal health services in Nigeria-looking beyond individual and household factors.* BMC pregnancy and childbirth, 2009. **9**(1): p. 43.
119. Afulukwe-Eruchalu, O., *Accountability for maternal healthcare services in Nigeria.* 2017(1879-3479 (Electronic)).
120. Ghana Statistical Service - GSS, Ghana Health Service - GHS, and ICF International, *Ghana Demographic and Health Survey 2014*. 2015, GSS, GHS, and ICF International: Rockville, Maryland, USA.
121. Osei-Assibey, E. and S.K. Grey, *2010 Population & Housing Census Report: Millennium Development Goals in Ghana*. 2013: Ghana Statistical Service.
122. GSS, M. and O. Macro, *Ghana service provision assessment survey 2002.* Calverton, MD: Ghana Statistical Service, Ministry of Heath, Ghana and ORC Macro, 2003.
123. World Health Organization, *Primary health care systems (PRIMASYS): a case study from Ghana.*, in *PRIMASYS* World Health Organization, Editor. 2017: Geneva.
124. UNICEF, *Ghana: Evaluation of the free maternal health care initiative in Ghana*. 2012, UNICEF: New York.
125. Bonfrer, I., L. Breebaart, and E. Van de Poel, *The effects of Ghana's national health insurance scheme on maternal and infant health care utilization.* PloS one, 2016. **11**(11): p. e0165623.
126. Ghana Statistical Service (GSS), Ghana Health Service (GHS), and ICF, *Ghana Maternal Health Survey 2017* 2018, GSS, GHS, and ICF: Accra, Ghana.
127. Dzomeku, M., *Maternal satisfaction with care during labour: a case study of the Mampong-Ashanti district hospital maternity unit in Ghana.* International Journal of Nursing and Midwifery, 2011. **3**(3): p. 30-34.
128. Floyd, L., et al., *Women's views and experience of their maternity care at a referral hospital in Ghana.* African Journal of Midwifery and Women's Health, 2014. **8**(4): p. 168-175.
129. Institute of Development Studies (IDS) and Ghana Statistical Services (GSS), *Domestic Violence in Ghana: Incidence, Attitudes, Determinants and Consequences* IDS, Editor. 2016: Brighton.
130. Moyer, C.A., et al., *Exposure to disrespectful patient care during training: data from midwifery students at 15 midwifery schools in Ghana.* Midwifery, 2016. **41**: p. 39-44.

131. Maya, E.T., et al., *Women's perspectives of mistreatment during childbirth at health facilities in Ghana: findings from a qualitative study.* Reprod Health Matters, 2018. **26**(53): p. 70-87.
132. Institut National de la, S.G. and I.C.F. International, *Guinée Enquíte Démographique et de Santé et Indicateurs Multiples (EDS-MICS) 2012*. 2013, Institut National de la Statistique/GuinÈe and ICF International: Rockville, Maryland, USA.
133. CDC. *Global Health-Guinea*. 2016; Available from: https://www.cdc.gov/globalhealth/countries/guinea/.
134. MCHIP, *MCHIP Country Brief: Guinea*. 2014.
135. UNICEF and WHO, *Tracking Progress towrads Universal Coverage for Reproductive, Newborn and Child Health: The 2017 Report* U.a. WHO, Editor. 2017: Washington, DC.
136. Elston, J., et al., *The health impact of the 2014–15 Ebola outbreak.* Public health, 2017. **143**: p. 60-70.
137. Institut National de la Statistique (INS) and ICF, *Enquête Démographique et de Santé en Guinée 2018 : Indicateurs Clés*. 2018, INS and ICF: Conakry, Guinée and Rockville, Maryland, USA.
138. Jackson, A., *Capacity building to prevent and respond to gender-based violence: Project description and evaluation of RESPOND/Guinea.* 2012.

CHAPTER 3: STUDY DESIGN AND METHODS

3.1 CHAPTER OVERVIEW

This chapter describes the methodology used to develop and assess a set of measures for mistreatment of women during facility-based childbirth using labor observation data from Nigeria, Ghana, and Guinea. The chapter first outlines the specific aims of the study and presents an overview of the data source, the WHO Multi-Country Study on How Women are Treated during Childbirth. The analytic methods used to develop and assess the validity and reliability of the measures are described. Finally, the methods used to assess the relationship between individual-, delivery-, and provider-related factors and mistreatment are discussed.

3.2 STUDY AIMS

Using labor observation data from the WHO Multi-Country Study on How Women are Treated during Childbirth, the specific aims for this study were to:

> **Aim 1:** Develop a set of valid and reliable measures for mistreatment of women during facility-based childbirth, including the following dimensions: interpersonal abuse, inappropriate conduct of exams & procedures, and unsupportive birth environment, using samples of women in Nigeria, Ghana, and Guinea.
>
> **Aim 2:** Identify individual-, delivery-, and provider-related factors associated with mistreatment during facility-based childbirth in Nigeria, Ghana, and Guinea using the measures developed and confirmed in Aim 1.

For Aim 2, we hypothesized that higher levels of mistreatment across all dimensions are observed among women who are young, who are not married, or who have low levels of education, as well as among women who have a nurse or midwife as a primary labor and birth attendant, who deliver at night or on the weekends, or who do not have a companion present during labor and delivery.

3.3 DATA SOURCE: OVERVIEW OF THE WHO MULTI-COUNTRY STUDY: *HOW WOMEN ARE TREATED DURING CHILDBIRTH*

The WHO Multi-Country Study on How Women are Treated during Childbirth was a multi-center mixed-methods study conducted between 2014-2018 in two phases involving data collection in four countries: Ghana, Guinea, Nigeria, and Myanmar. The study represents collaborative efforts between the WHO Department of Reproductive Health and Research (RHR)/Special Programme of Research, Development and Research Training in Human Reproduction (HRP) and in-country investigators. Phase 1 (2014-2016) was a qualitative study that established the first evidence-based definition and typology for mistreatment through a mixed-methods systematic review of mistreatment literature, a qualitative systematic review of respectful maternity care (RMC) and systematic mapping of existing measurement tools for mistreatment and RMC. It also involved consultation with researchers who developed the tools and a formative qualitative study in the four countries. Findings from Phase 1 were then used to develop two survey instruments: a direct labor observation tool and a community survey administered to women who delivered in study facilities up to 8 weeks postpartum. Phase 2, conducted between 2016-2018, employed both quantitative and qualitative methods to test and validate these tools in facilities and community settings.

The research for this dissertation is a secondary analysis of data from the labor observation tool from Phase 2 of the WHO study. The study only used data from Nigeria, Ghana, and Guinea because labor observations could not be conducted in Myanmar. To date, there has not been an analysis of the psychometric properties of items in either the WHO typology of mistreatment or the survey instruments. This study aimed to address this gap through analyses involving both scale development through psychometric analysis as well as index development to generate a condensed, yet comprehensive set of mistreatment measures.

Direct observation documenting treatment during labor and delivery in real time was used in this study to develop measures that gauge the magnitude of mistreatment. Self-report is the gold standard for research on violence against women [70] and direct observation is the standard in quality of care assessment [5, 139], but there is currently no established gold standard for measuring mistreatment. Recent studies indicate that women underreport abusive care until pressed about whether they experienced specific behaviors or instances [33, 46, 87, 140]. Surveying women close to delivery may greatly impact prevalence estimates, with one study finding that when women were surveyed at discharge, 15% reported any disrespect and abuse; when the same sample of women was surveyed again in their community at two weeks postpartum, the prevalence estimate was 70%. Another study found 19.5% of women reporting mistreatment in facilities compared to 28% when they were surveyed again in community settings [46]. A study that assessed discordance between women's reports of mistreatment and labor observations also found that 10% of women self-reported mistreatment versus 22% reported by observers [140]. Based on previous studies, it was assumed that direct labor and delivery observation would not be subject to the same recall or social desirability biases that may affect women's reports in the community survey tool [46, 58, 60, 140].

3.3.1 The WHO Typology for Mistreatment and Development/ Preliminary Validation of Measurement Tools

The WHO 7-part typology for mistreatment served as the basis for the items included in the survey instruments in the larger WHO study as well as the item pool for the measures developed in this research **(Appendix 1)** [14]. The typology includes the following seven domains of mistreatment ordered from the interpersonal to the more distal facility-level: 1) physical abuse, 2) sexual abuse, 3) verbal abuse, 4) stigma and discrimination, 5) failure to meet professional standards of care, 6) poor rapport/communication between women and providers,

and 7) health systems conditions and constraints. The typology further classifies mistreatment in two nested layers within the seven domains. The first-order items refer to specific behaviors or events, and the second-order classifies first-order items into broader domains. The systematic review by Bohren et al. (2015) of mixed-methods research on mistreatment in Phase 1 of the WHO study led to the initial development of the WHO typology [14]. Phase 1 further refined dimensions of the typology through formative research using interviews and focus groups with women who recently delivered in facilities, healthcare providers, and facility administrators in two facilities in each of the study countries [141].

Building on the findings from Phase 1, the tools were constructed using a systematic mapping of items in existing instruments reported in the Bowser & Hill (2010) landscape analysis [4], along with comparison of items in some recent measurement studies on mistreatment with those in the WHO typology domains [46, 60, 64]. Final item development for the instruments occurred through expert review by the WHO Technical Working Group on Mistreatment of Women during Childbirth.

Three additional steps were applied to finalize both survey instruments to achieve face and content validity, meaning the extent to which the items represent the full domain of a construct [142]. A group of experts reviewed both tools a second time to determine the relevance of each item to the desired construct, identify gaps, and provide suggestions for additional items where needed. Next, a sample of women in Nigeria who had recently given birth in a Phase 1 facility reviewed the community survey through cognitive interviews to determine item relevance, understandability, and clarity. The instruments were adjusted based on results of these reviews before finalizing and moving to Phase 2.

3.3.2 Study Procedures

Both the labor observation and community survey tools collected information about care received during admission, delivery, and the immediate postpartum period; both tools largely included the same items. The tools were first used in the Nigerian facilities. Results were assessed to determine whether they needed further refinement. The instruments were then used with the samples in the other two countries, Ghana and Guinea. Data collection occurred between September 2016 and February 2017 in Nigeria and between July 2017 and February 2018 in Ghana and Guinea.

Labor Observation Tool

For the data used in this study, participating women were continuously observed by a trained, non-clinical female observer from admission to two hours postpartum. Each observer monitored only one woman at a time and followed the same women throughout the observation period (unless there was a switchover in observer shifts). Observers completed the labor observation tool via an electronic tablet, including information on maternal sociodemographic characteristics and reproductive history, use of medical interventions, maternal/neonatal outcomes, and all interactions between women, providers, and facility staff.

Four forms were completed for each woman in Nigeria: 1) Admission Form, 2) Inpatient Care Form, 3) Childbirth/Interventions/Discharge Form, and 4) Incident Report Form; the forms were condensed to three in Ghana and Guinea: (1) Admission Form, 2) Childbirth Form, and 3) Incident Report Form. On the Incident Report Form, observers recorded three aspects of an incident: 1) whether a specific instance of mistreatment occurred (e.g., "during the observation period, was the woman slapped?": 1) no or 2) yes)), 2) the exact time it occurred and whether it occurred during the intrapartum or postpartum period, and 3) who committed it (doctor,

nurse/midwife, trainees, non-clinical staff, family member/companion, other). In the event of repeated occurrences of the same type of mistreatment, a separate incident report was recorded for each.

Community Survey

Women who delivered in a study facility during the study period were eligible for the interviewer-administered community survey up to 8 weeks postpartum. Trained non-clinical female interviewers conducted the survey at a time and private location convenient for the participant. Women may have, but need not to have, been enrolled in the labor observation portion of the study to take the community survey.

Linked Labor Observation and Community Survey Data

Upon study enrollment, women were assigned a participant identification number that linked the observation and survey documents. Overall, 76% of women had linked data (81% in Nigeria, 84% in Ghana, and 62% in Guinea).

3.4 STUDY SAMPLE

Study countries were purposively selected to obtain data from a range of cultural and geographic settings, as well as existing research partnerships with WHO RHR/HRP. In Phase 2, one regional district was purposively sampled within each country (different regions than in Phase 1). They included Ondo and Oyo States in Nigeria, the Greater Accra Region in Ghana, and Conakry and Lower (Maritime) in Guinea. Three facilities were selected within each region. Facilities were eligible for inclusion if they had not participated in Phase 1, had a defined catchment area, were at least secondary-level facilities, performed at least 200 deliveries per month, and permitted direct labor observations. All facilities sampled were public facilities located in urban areas (**Table 3.1**).

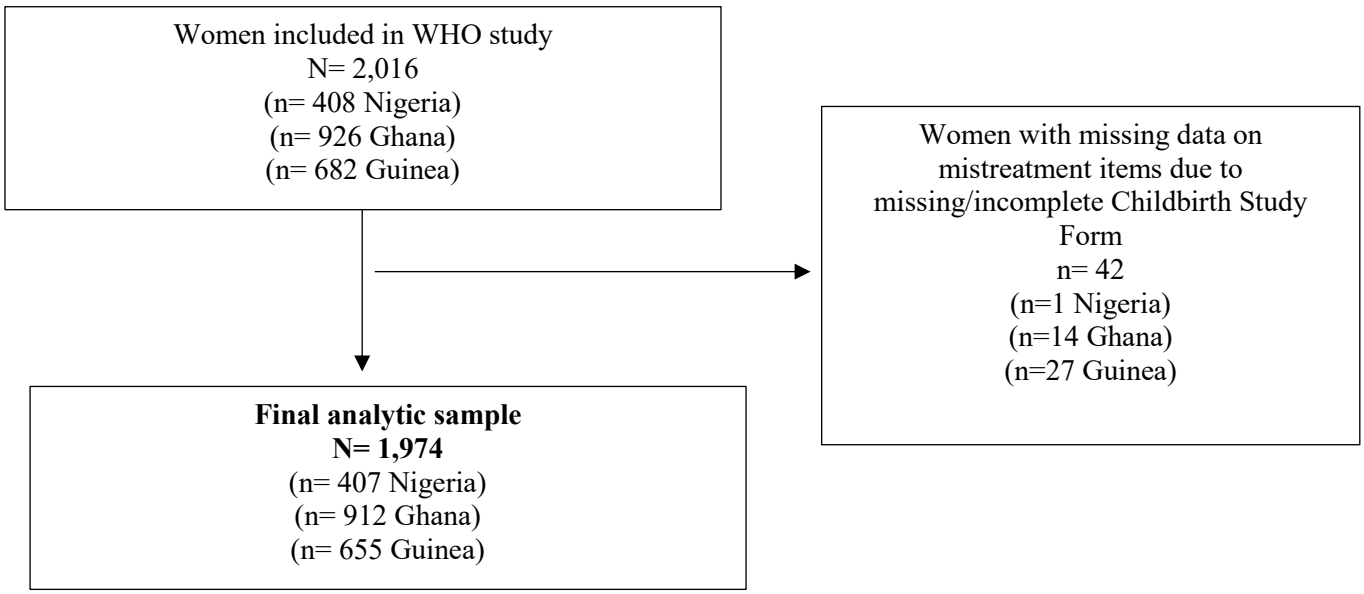
Women were recruited and screened for eligibility upon admission to a study facility. Unless they had visible signs of distress or obstetric emergency, all pregnant women entering the facility were approached in a central location (e.g., emergency ward or labor ward) for eligibility screening. They were eligible to participate if they were in active labor and were admitted to the facility for childbirth, were at least 15 years of age, and provided written consent. Women were excluded if they were related to a facility employee, were immediately taken to an operating room on admission, were immediately referred to a different facility, or were experiencing labor complications or distress upon arrival. A total of 2,016 women were included in the labor observation arm of Phase 2 of the WHO study in the three countries. A total of three women across countries were eligible for enrollment but declined to participate.

The current study included 1,974 women with observations during labor and delivery and who did not have missing data on the mistreatment items (407 women in Nigeria, 912 in Ghana, and 655 women in Guinea); 42 women were excluded with either a missing or incomplete Childbirth Study Forms (n=1 in Nigeria, n=14 in Ghana, and n=27 in Guinea). **Table 3.1** shows the number of women in each facility in each country, and **Figure 3.1** displays the number of women with missing data and the final sample numbers for each country.

Table 3.1. Study Site Selection and Sample Size by Country Included in Analysis (N=1,974)

	Nigeria (N=407)			**Ghana (N=912)**			**Guinea (N=655)**		
	Facility 1	**Facility 2**	**Facility 3**	**Facility 4**	**Facility 5**	**Facility 6**	**Facility 7**	**Facility 8**	**Facility 9**
Sample size	189	116	102	306	294	312	222	219	214
Location	Oyo State	Ondo State	Ondo State	Greater Accra	Greater Accra	Greater Accra	Lower (Maritime) Guinea	Lower (Maritime) Guinea	Conakry
Facility type	Public (Urban)	Public (Urban)	Public (Urban)	Public (Urban)	Public (Urban)	Public (Urban)	Public (Urban)	Public (Urban)	Public (Urban)
Average monthly birth volume	160	450	200	790	560	251	207	217	375
Number of obstetric beds	90	53	57	261	113	56	15	20	27

Figure 3.1 Flow Diagram of Analytic Sample



3.5 AIM 1: METHODS FOR DATA ANALYSIS

Aim 1: Develop a set of valid and reliable measures for mistreatment of women during facility-based childbirth, including the following dimensions: interpersonal abuse, inappropriate conduct of exams & procedures, and unsupportive birth environment using samples of women in Nigeria, Ghana, and Guinea.

3.5.1 Preliminary Data Evaluation: Item Construction, Grouping, and Identifying Dimensions

Item Construction

A preliminary item pool of 56 binary items obtained from the three forms in the labor observation tool were used to develop the mistreatment measures. The items are based on five domains of the WHO mistreatment typology: physical abuse, verbal abuse, failure to meet professional standards of care, poor rapport/communication between women and providers, and health systems conditions and constraints. The sexual abuse domain of the mistreatment typology was not measured with the study tools. Further, in preliminary data evaluation, the frequency of items in the stigma/discrimination domain was uniformly low across the three

country samples. In consultation with the WHO study team, the decision was made to not include stigma/discrimination as a component of the developed measures because labor observations may not be the most accurate mode to assess stigma/discrimination as it may be more intrinsically based on perceptions and internal experience [143].

In the methods reported in this chapter, the term "dimensions" refers to mistreatment concepts represented in the newly developed measures in the analysis of the 3-country data, while "domains" refers to the 7 broad categorizations in the WHO typology of mistreatment. Extensive exploratory data analysis was conducted on all three country samples using an inductive, iterative approach to determine how best to operationalize dimensions of mistreatment. Frequencies for each item were calculated, and determinations were made about combining items based on theory and practicality (e.g., collapsing three items about whether a woman did not have a bed during 1) labor, 2) delivery, and 3) postpartum into a single item), as well as understandability and item translation across study countries. The pattern of repeating events and co-occurring mistreatment incidents was also examined to determine the most appropriate scoring structure for the measures. Item generation through collapsing existing items was done iteratively and in continuous consultation with experts on the WHO study team to reflect conceptual consistency, the data, and practical experience to maintain face and content validity.

Completeness of the labor observation data was high for the mistreatment items at 98% (1,974/2,016). The pattern of missing data for the 42 women with incomplete or missing data collection forms was assessed within each country to determine if items were clustered by facility or by observer within a facility. While nearly two thirds of missing or incomplete data

forms were in Guinea (27/42), no such clustering was observed. As mentioned above, women with missing data on the mistreatment items were not included in the analyses.

All mistreatment items were constructed as dichotomous, where "0=no mistreatment" and "1=mistreatment". Where applicable, items were reverse coded to be consistent with this structure. Items that contained "not applicable" or "don't know" categories were recoded so that responses in these categories were replaced with "0=no mistreatment" on that item to give the most conservative estimate on the mistreatment measures (**Table 3.2**). All analyses were conducted using Stata 15.0 [144].

Item Grouping and Identifying Dimensions

The original aim of this study was development of a set of scales that map directly onto the domains of the WHO typology of mistreatment in Nigeria first, and then validation of the scales in Ghana and Guinea. However, it became clear during preliminary data evaluation that both the relevant dimensions that had been identified and the operationalized measures deviated significantly from the WHO typology, limiting the feasibility of developing only scalar measures of mistreatment. The study aims were thus revised to develop and assess the validity and reliability of a new set of measures using data from all three country samples simultaneously. Several versions of these measures were developed and tested that informed the final grouping of items, and the items were confirmed by consensus of a group of experts on the WHO study team. Three dimensions of mistreatment were identified, labeled as: interpersonal abuse, inappropriate conduct of exams & procedures (referred to hereafter as "exams & procedures"), and unsupportive birth environment. **Table 3.2** describes the construction of the final items included in each mistreatment dimension.

As mentioned, the expectation was that a set of mistreatment scales would be developed to measure each dimension using psychometric analysis under the assumptions of classical test theory. Three preliminary tests were performed on all three dimensions both separately and as a single composite measure to determine the appropriateness of this approach. First, the suitability of the data for principal components analysis (PCA) and factor analysis (i.e., "factorability") was determined by Bartlett's test of sphericity where $p<0.05$ indicates correlation between items is large enough to warrant factor analysis. The Kaiser-Meyer-Olin (KMO) measure of sampling adequacy (using 0.50 as the criterion) also indicated whether a common factor structure may underlie the data [142, 145]. Based on these tests, factorability was only established for the items in the interpersonal abuse dimension. To confirm this conclusion, PCA and exploratory factor analysis (EFA) were conducted on items from all dimensions, both separately by dimension and combined. Only the correlation patterns among interpersonal abuse items yielded a consistent factor structure. Thus, it was determined that the set of measures developed for mistreatment would include one scale measuring interpersonal abuse, and two indexes measuring exams & procedures and unsupportive birth environment.

The resultant measure construction echoes the notion in the conceptual framework proposed in Chapter 2 that there is not a single common factor underlying all dimensions of mistreatment; rather, mistreatment is a multidimensional concept including an interpersonal abuse (physical abuse, verbal abuse) construct within a more general violence framework, and a broader construct of mistreatment/treatment tied to the process of care. This measure construction is also consistent with measures operationalized in related research areas. There is precedent in existing literature that the constructs of violence and abuse are measured using psychometric scales [146-149], most prolifically through adaptations of the Conflict Tactics

Scale [72, 73]. Conversely, quality of care in maternal and newborn health has typically been measured using clinimetric indexes and checklists that assess the quality of more heterogenous clinical and diagnostic items [150-153]. A more detailed discussion of the distinction between these two types of measures is presented below.

Scales versus Indexes

Given the focus in this research on both scale and index development, a brief overview of the theoretical and computational differences between these two kinds of measures is warranted. While often used interchangeably and non-uniformly in the literature, scales and indexes are quite distinct. Broadly speaking, unidimensional scales are a collection of observable items that combine into a score that is presumed to reflect the level of a single underlying latent construct that cannot be directly measured; in this study, the scaled latent construct would be "interpersonal abuse" [142]. In this way, scales are "reflexive indicators" in that a single construct determines (or "causes") the level of the scale items (known as "effect indicators"). As a result, items are theoretically homogeneous and highly correlated. This relationship between scale items and the latent construct is depicted below in *Equation (1)*[154, 155]:

$$(1)\quad y_i = \lambda_i \eta + \varepsilon_i;$$

Where: y_i= scale item/effect indicator; λ_i= "factor" loading, or the effect of the latent construct on the item; η= latent construct; and ε_i= item error term.

On the other hand, indexes are "formative indicators" in that they are a scored set of items that together determine (or "cause") the level of the underlying construct (in this case, "inappropriate conduct of exams & procedures" or "unsupportive birth environment"). Index items have different underlying causes and contribute uniquely to influencing the level of the construct. Thus unlike scales, there is no assumption of homogeneity or that there will be a correlation between index items given their independent causes, regardless of their theoretical

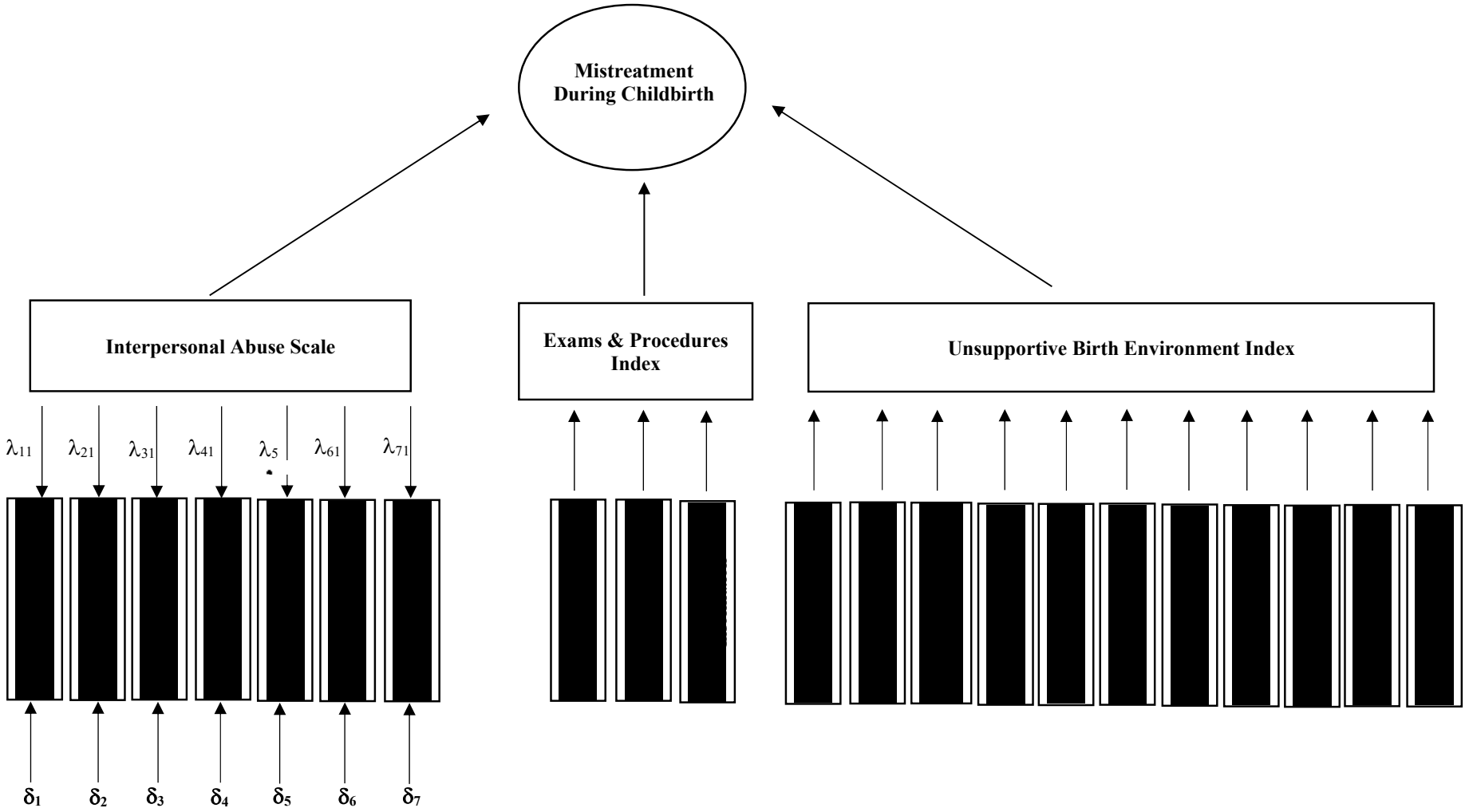
relation to the latent construct [155, 156]. This formative relationship is illustrated below in *Equation (2)* [154, 155]*:*

$$(2) \quad \eta = \lambda_1 x_1 + \ldots \lambda_k x_k + \zeta$$

where: η= latent construct; x_i= index item/causal indicator; λ_i= path coefficient and ζ= error term, or "disturbance".

To underscore these differences, the contrasting directional relationships between items and constructs in the mistreatment measures developed in this study are highlighted in the path model below (**Figure 3.2)**. Given the fundamental differences between scales and indexes, experts in measurement and tool development have called for different methodologic approaches to developing and validating these measures [142, 155-158]. This study used a psychometric approach under the assumptions of classical test theory outlined by DeVellis (2016) and Netemeyer (2003) to develop an Interpersonal Abuse Scale in Nigeria, Ghana, and Guinea [142, 145]. An approach informed by clinimetrics and other composite index development guidelines was then used to develop an Exams & Procedures Index and an Unsupportive Birth Environment Index in the three settings [150-152, 159-163]. Further details on the differences in developing these measures will be discussed in subsequent sections.

Figure 3.2 Path Model for Mistreatment of Women During Childbirth



λ= scale item factor loading
δ= scale item-specific measurement error term
Items (Y) are functions of latent factor loading ($\lambda_x F$) and measurement error; $Y_x = \lambda_x F + \delta_x$

Table 3.2. Description of Mistreatment Items; Higher Scores= Higher Levels of Mistreatment

Mistreatment Dimension	Item	WHO Mistreatment Labor Observation Tool Question	Item scoring coding[a] (0= no mistreatment 1=mistreatment)
Interpersonal Abuse Scale (7 items)	1. Shouted/screamed at	Was the woman shouted or screamed at?	0: Q=1 (no), 9 (DK) 1: Q=2 (yes)
	2. Insulted	Was the woman insulted?	0: Q=1 (no), 9 (DK) 1: Q=2 (yes)
	3. Scolded	Was the woman scolded?	0: Q=1 (no), 9 (DK) 1: Q=2 (yes)
	4. Mocked	Was the woman mocked?	0: Q=1 (no), 9 (DK) 1: Q=2 (yes)
	5. Negative comments	Did the woman receive negative comments about: 1) her physical appearance (including her weight, genitalia, cleanliness, or other aspects of a woman's body), 2) her sexual activity, 3) or her baby's appearance (including his/her sex or other aspects of the baby)?	0: Q=1 (no), 9 (DK) 1: Q=2 (yes) on at least one negative comment
	6. Threatened	Was the woman threatened with: 1) physical violence, 2) a poor outcome for her or her baby, 3) withholding care from her or her baby, or 4) with the use of a medical procedure (such as episiotomy, Cesarean, or other procedure)?	0: Q=1 (no), 9 (DK) 1: Q=2 (yes) on at least one threat
	7. Physical abuse	Did the woman the woman experience *at least one* of the following: *Physically struck:* pinched, kicked, slapped, punched, or hit with instrument, or *Forceful restraint or pressure:* gagged, physically tied to the bed, held down to the bed forcefully, given forceful downward pressure on abdomen, other use of physical force	0: Q=1 (no), 9 (DK) 1: Q=2 (yes) on at least one physical abuse item
	Deleted Items		*Reason for deletion*
	Hissed	Was the woman hissed at?	Nigerian-specific item
	Blamed	Was the woman blamed for her or her baby's poor outcome?	Low frequency, low factor loading

(cont).

Mistreatment Dimension	Item	WHO Mistreatment Labor Observation Tool Question	Item scoring coding[a] (0= no mistreatment 1=mistreatment)
Exams & Procedures Index (3 items)	1. Informed consent[b]	Did a staff member 1) inform the woman why a procedure or first vaginal exam performed was needed, and 2) obtain her permission for it: 1. Cesarean, 2. Episiotomy, 3. Hysterectomy, 4. Tubal ligation, 5. Postpartum IUD insertion	0: Q=2 (yes), 9 (DK) 1: Q=1 (no) on either first vaginal exam or procedure
	2. Exposed[c]	Did a staff member conduct a vaginal exam in a way that others could see her genitals or breasts?	0: Q=1 (no), 9 (DK) 1: Q=2 (yes)
	3. Confidential information[c]	[During a vaginal exam], did a staff member discussed the woman's private health information in a way that others could hear (non-medical staff, other patients or other patients' family members)?	0: Q=1 (no), 9 (DK) 1: Q=2 (yes)
Unsupportive Birth Environment Index (11 items)	*Support*		
	1. Pain relief	Was the woman offered any form of pain relief *or* was the woman given pain relief if she requested it?	0: Q=2 (yes), 9 (DK) 1: Q=1 (no)
	2. No interpreter	Was an interpreter used [if the woman's primary birth attendant did not speak same language as the woman?]	0: Q=2 (yes), 9 (DK), 8(NA) 1: Q=1 (no)
	3. No staff present at birth	Was a staff member present when the baby came out?	0: Q=2 (yes), 9 (DK) 1: Q=1 (no)
	4. Neglect	Did the woman request medical attention from a health worker that was not responded to?	0: Q=1 (no), 9 (DK) 1: Q=2 (yes)
	Birth Environment		
	5. Bribe	At any time, did staff suggest or ask the woman (or companion) for a bribe, informal payment, or gift?	0: Q=1 (no), 9 (DK) 1: Q=2 (yes)
	6. Clean up blood/fluids	At any time, was the woman instructed to clean up blood, urine, feces, or amniotic fluid?	0: Q=1 (no), 9 (DK). 1: Q=2 (yes)
	7. Fluids	During labour, did the woman have easy access to water or oral fluids?	0: Q=2 (yes), 9 (DK) 1: Q=1 (no)
	8. Mobilize	Was the woman told she could mobilize during labour?	0: Q=2 (yes), 9 (DK) 1: Q=1 (no)

Mistreatment Dimension	Item	WHO Mistreatment Labor Observation Tool Question	Item scoring coding[a] (Q=0, no mistreatment Q=1, mistreatment)
	9. No curtains/partitions	Were curtains, partitions, or other measures used to provide privacy for the woman during: 1. labour, 2. delivery, or 3. postpartum?	0: Q=2 (yes), 9 (DK) 1: Q=1 (no) during at least one period
Unsupportive Birth Environment Index (11 items) ***(cont.)***	10. No bed	Did the woman have a bed during: 1. labour, 2. delivery, or 3. postpartum?	0: Q=2 (yes), 9 (DK) 1: Q=1 (no) during at least one period
	11. Shared bed	At any time, did the woman have to share a bed with another woman or women?	0: Q=1 (no), 9 (DK) 1: Q=2 (yes)
	Deleted Items		*Reason for deletion*
	Preferred birth position	Was the woman asked her preferred birthing position?	>90% frequency in all 3 countries
	Offered birth companion	Was the woman offered to have a birth companion?	Data issues with item understandability, validity; frequency uniformly high in all 3 settings

Table 3.2

[a] Items constructed from original WHO labor observation tool items (1=No, 2=Yes, 8=Not applicable (NA), 9=Don't know (DK), "b"=blank). [b]Denominator: only those who had a vaginal exam and/or procedure. [c] Denominator: only those who had a vaginal exam

3.5.2 Scale Development: Psychometric Analysis

WHO RHR/HRP took the formative steps needed for scale development to create the structure for the WHO typology of mistreatment (**Appendix 1**) by establishing face and content validity through a systematic review of literature, extensive qualitative work, expert review, and cognitive interviewing [142, 145, 146]. In this study, factor analysis was conducted separately by country to assess the construct validity (the degree to which items represent the underlying factor structure, and the extent to which scale items correlate with other theoretically related measures) and the reliability of the Interpersonal Abuse Scale [142, 145]. EFA is an iterative data-reduction method that aims to both examine correlation structures among a pool of items and reduce the pool to the most parsimonious set representing the fewest latent factors [142, 145]. Given thethis early developmental stages of operationalizing the Interpersonal Abuse Scale as a dimension of mistreatment, confirmatory factor analysis (CFA) was not warranted because CFA tests a strong theoretical a priori conceptualization/factor structure of a construct [72, 73, 142, 145].

Principal Components Analysis (PCA) and Factor Extraction

Prior to PCA, tetrachoric correlation matrices were examined to assess the interrelatedness of the interpersonal abuse items in each country. Pearson correlation matrices were not appropriate in this case because they assume variables are continuous; Pearson correlations with non-continuous data tend to result in underestimated parameters [164]. Instead, PCA and EFA were conducted using tetrachoric correlation matrices as the corollary that are applied to binary variables using the "polychoric", "polychoricpca," and "factormat" commands in Stata [142, 144, 164]. Interpretation of tetrachoric correlations is the same as for Pearson correlations. The correlation matrix determines the extent to which variance is shared among items due to the latent factor (covariance, the off-diagonal in the matrix; i.e., the "signal") as well

as the variance that is unique to the items (variance; the diagonal in the matrix; i.e., the "noise" [142]) .

A PCA was then conducted on the tetrachoric matrix to determine the number of common factors to extract for factor analysis. The number of retained factors was selected based on four criteria: Kaiser's rule of retaining eigenvalues > 1.0 (the proportion of variance accounted for by an item), the "bend" in the scree plot (plot of eigenvalues), the proportion of variance explained by the factors, and parallel analysis tests (which compare the number of components yielded in a PCA by the real dataset to those from an iteration of simulated datasets with the same sample sizes, number of variables, means and variances, but where correlations exist by chance alone) [142, 145, 165].

Factor Analysis

EFA was performed on an iterative basis using iterated principal factor estimation, a common method to estimate parameters in EFA. As EFA was conducted on three separate country samples, splitting samples in half to perform factor analysis was not necessary [145]. To establish unidimensionality, a prerequisite for scale development, items that loaded with $\lambda < 0.40$ (where λ is the factor loading, or the degree of association between the latent factor and an item; <0.40 indicates poor loading) or $\lambda > 0.90$ (indicating redundancy) were dropped [145]. In models where two common factors could be extracted, oblique rotation was used to simplify interpretability on the premise that the two interpersonal abuse factors were correlated. Item uniqueness was assessed with the goal of minimizing uniqueness (using the benchmark of < 0.50 as "acceptable,"), though retaining items with high factor loading was prioritized over low uniqueness [142]. Following item deletion or model re-specification, factor structures were examined to determine similarities and deviations across the three countries. The PCA and EFA

processes were then repeated for each country sample until a final factor structure was confirmed.

Validity

There is currently no "gold standard" measure of mistreatment, so the ability to establish criterion validity was limited in this study [142]. However, construct validity was assessed in a variety of ways. Structural validity and cross-cultural validity/measurement invariance, two components of construct validity related to internal factor structure, were assessed by the factor structure emerging from EFA and from examining interitem correlations. Unidimensionality established through EFA with standardized loadings of >0.40 on a single dominant factor coupled with high inter-item correlation provides evidence of structural validity. A consistent factor structure across multiple datasets provides further evidence of structural and cross-cultural validity/measurement invariance [162, 163, 165]. Further analysis of construct validity using hypothesis testing and correlations between mistreatment measures is described in a subsequent section as it was applied to the Interpersonal Abuse Scale and both mistreatment indexes.

Reliability

Internal consistency of scales, a component of reliability, refers to the magnitude of shared variance among scale items that is determined by the latent factor, or the degree of homogeneity among items [142, 145]. It was assessed in two ways. First, inter-item correlations and corrected item-to-total correlations in the tetrachoric matrix were examined (using a range of 0.15-0.50 as evidence of internal consistency, particularly a range of 0.15-0.20 for newer measures [142, 145, 165]). Second, the Kuder-Richardson-20 (KR-20) coefficient was calculated (*Equation 3*). The KR-20 coefficient is the corollary to Cronbach's alpha that is used for scales based on dichotomous items. A coefficient of ≥ 0.70 for the KR-20 coefficient is considered the

benchmark for internal consistency in scale development [72, 73, 142, 145]. Like Cronbach's alpha, the KR-20 coefficient is only a measure of internal consistency, not dimensionality ;the KR-20 was calculated only after scale unidimensionality was established [155].

The **KR-20 coefficient** [145] is:

$$(3)\ \alpha = \frac{k}{k-1}\left(1 - \frac{\sum pq}{\sigma_n^2}\right)$$

Where p= item mean (or proportion responding "yes" to item *i*); q= (1-item mean); and Σpq= sum of item variances

3.5.3 Index Development

Indexes are based on a different paradigm from psychometric scales; measures to determine validity and reliability that rely on assumptions of item homogeneity are not applicable (e.g., correlation matrices, the KR-20 coefficient). In consultation with experts on the WHO study team and an external measurement expert, the index item pool (i.e., those items that were not deemed appropriate for factor analysis) was judged to contain items that fall into two distinct theoretical and clinical dimensions: 1) non-consented care and non-confidential care during exams and procedures, and 2) an unsupportive birth environment. Two separate indexes, rather than a single composite index, were constructed to maintain face and content validity.

Indexes for Exams & Procedures and Unsupportive Birth Environment were developed based on an approach adapted from the Organization for Economic Cooperation and Development (OECD) procedures for composite index development [159], the indexing approach outlined in the Consensus-based Standards for the selection of health Measurement Instruments initiative (COSMIN) [162, 163], as well as other indices measuring quality of care in maternal and reproductive health [150-152, 161, 166] .

Theoretical Framework, Metric Selection, and Missing Data/Imputation

Consistent with the first steps of the OECD composite index development approach, item selection occurred through use of a theoretical framework (in this case, the WHO typology of mistreatment), literature review, and expert opinion, as well as addressing missing data and imputation during preliminary data analysis of the full item pool. To obtain more accurate estimates, the Exams & Procedures Index was constructed using the denominator of women who received at least one vaginal exam and/or at least one procedure (Cesarean, episiotomy, hysterectomy, tubal ligation, or postpartum IUD insertion), rather than using the full sample and scoring women who did not have an exam or procedure as "0=no mistreatment" on these items.

Initial Data Analysis and Normalization

Frequency of items in each index by country were examined, and those that occurred in >90% of observations in all three countries were omitted; items that were nearly universally performed would not meaningfully contribute to the index in distinguishing between levels of mistreatment (or from those who were mistreated and those who were not), and they would also artificially inflate index scores. The study team also determined that these high-frequency items were not theoretically important enough to the measurement dimensions to justify retaining them. One item assessing whether a woman was offered to have a birth companion was uniformly high, but did not reach >90% frequency in all three samples. This item was still omitted from the Unsupportive Birth Environment Index based on consultation with the WHO team that it was problematic and not understood uniformly in all settings.

Items that occurred very infrequently (<5%) in all three settings were also considered for deletion but were ultimately retained. Unlike in factor analysis where low frequency items are often flagged for deletion, one of the primary goals in index development is to include enough

items to fully cover the content of the measured dimension; in indexes, the items define the latent construct [156, 167]. Based on expert feedback and the null effect on scoring that would result from including low frequency items, they were retained to improve content validity and err on the side of over-inclusion for future validation of these indexes. In sensitivity analyses, index versions that included and omitted combinations of high and low frequency items were assessed for performance based on the criteria discussed in Section 3.5.4.

As all items were binary, defined as "0=no mistreatment" and "1=mistreatment," no normalization was required. Further details on weighting, scoring, and finalization are presented in the next section.

3.5.4 Scoring & Finalizing Measures

Scoring

For all three mistreatment measures, items were scored as "1" if there was a least one report of this incident, and "0", otherwise so that when items were summed, higher scores indicated higher levels of mistreatment. Scores were aggregated separately by measure using simple summative scoring without weighting, with the following score ranges by measure: Interpersonal Abuse Scale (0-7), Exams & Procedures Index (0-4), and Unsupportive Birth Environment Index (0-11).

Measure Performance

Item frequencies, mean scores, and percent distributions of mistreatment scores were calculated separately by mistreatment measure and country. Other descriptive statistics were calculated to assess measure performance, including low and high scores and the range of item frequency (the number of items occurring in <5% and >90% of observations). Ceiling and floor effects were assessed through the percent distribution of observations with minimum and

maximum scores, using 15% in either category as evidence of ceiling or floor effects; presence of these effects could indicate inadequate content validity [151, 168].

3.5.5 Measure Validation and Reliability Assessment

Construct Validity

Correlations between mistreatment measures were assessed through Spearman-rank correlations (used for ordinal scores). Low correlations (<0.30, $p>0.05$) across different measures provide evidence of construct validity and confirm that the measures should be assessed separately rather than as an overall composite measure.

Another key aspect of construct validity is the extent to which measures are associated with theoretically related measures or constructs in predictable ways [142, 165]. Distinct from the risk factors analysis conducted in Aim 2, this analysis evaluated crude, simple associations and correlations between mistreatment scores and variables that have been shown in previous research to be associated with mistreatment; evidence that the scores are associated with these variables in the direction documented in previous studies helps establish construct validity of the measures [142, 163, 167]. Bivariate logistic regression was conducted using ordinal measurement scores as the independent variables and several binary variables related to labor/delivery and facility characteristics as dependent variables.

Further testing was conducted using linked data of women's responses on the WHO community survey tool on a postpartum depression scale and global measures of satisfaction with care as outcomes regressed on mistreatment scores. Global measures of satisfaction included overall satisfaction with care received during labor and delivery, and intention to deliver in the same facility for a future delivery, both of which have been used previously to assess construct validity in studies measuring mistreatment [56, 61, 75-77, 93]. **Table 3.3**

outlines the variables used in the construct validity analysis using logistic regression, as well the hypotheses tested.

Table 3.3 Variables Included in Construct Validation Analyses of Mistreatment Measures

Variable	Hypothesis
1. Day of delivery (weekday vs. weekend)	Higher odds of weekend delivery are associated with higher mistreatment scores
2. Time of delivery (day vs. night)	Higher odds of nighttime delivery are associated with higher mistreatment scores
3. Birth companion present during labor and/or delivery (yes vs. no)	Lower odds of having companion present associated with higher mistreatment scores
4. Primary labor attendant (doctor/trainee/other vs. nurse/midwife)	Higher odds of having nurse/midwife as primary attendant are associated with higher mistreatment scores
5. Overall satisfaction with care (satisfied/neutral vs. dissatisfied)	Higher odds of dissatisfaction with care are associated with higher mistreatment scores
6. Intend to deliver in same facility in the future (no vs. yes)	Lower odds of future intention to deliver in same facility are associated with higher mistreatment scores
7. Postpartum depression (none vs. any)	Higher odds of any postpartum depression are associated with higher mistreatment scores
8. Average monthly facility volume (Pearson product-moment coefficient)	Positive correlation between high facility birth volume and high mistreatment scores

Internal Consistency

Two additional tests of internal consistency were conducted on all three mistreatment measures to further determine the reliability of the Interpersonal Abuse Scale and to establish a degree of consistency in the two indexes. First, the percent distributions of co-occurring mistreatment items were examined, where internally consistent measures would have higher proportions of items that occur with at least one or several other items in a measure. Second, to determine if each item could distinguish between "high" and "low" scores of mistreatment, a

binary variable was constructed where "high" scores included observations with scores higher than the country-specific mean, and "low" included those scoring at or below the country-specific mean [166, 169]. The proportion of women experiencing a mistreatment item who had "high" and "low" scores was then calculated; if scores were internally consistent and distinguished between these two groups, we would expect to see a higher proportion of women in the "high" score group experiencing each item [169].

3.6 AIM 2: METHODS FOR DATA ANALYSIS

Aim 2: Identify individual-, delivery-, and provider-related factors associated with mistreatment during facility-based childbirth in Nigeria, Ghana, and Guinea using the measures developed and confirmed in Aim 1.

> **Hypothesis 2a**: Women with low levels of education, of young age, and with single marital status have increased odds of mistreatment across all dimensions of mistreatment.
>
> **Hypothesis 2b:** Women who had nurses/midwives as primary attendants, did not have a birth companion present during labor or delivery, and delivered at night or on a weekend have increased odds of mistreatment across all dimensions of mistreatment.

3.6.1 Dependent Variables

Scores on the Interpersonal Abuse Scale, the Exams & Procedures Index, and the Unsupportive Birth Environment Index were the bases of the dependent variables for Aim 2, analyzed as binary variables defined as a 1 for mistreatment scores above the country-specific mean and a 0 for scores at or below the country-specific mean (reference category) [166].

3.6.2 Covariates

Table 3.4 lists the covariates included in multivariate analysis. Covariates were selected based on previous research, the conceptual framework proposed in Chapter 2 and collinearity with other variables.

Table 3.4. Covariates Included in Multivariate Risk Factors Analyses

	Covariate	Description
Individual characteristics	Age (categorical)	15-19 years 20-29 years (reference) 30+ years
	Education level (categorical)	None/Primary (reference) Secondary Post-secondary or higher
	Marital status (binary)	Currently married (reference) Not married
	Number of previous births (categorical)	0 (reference) 1 2+
Provider characteristics	Primary attendant through labor and delivery (categorical)	Nurse/midwife (reference) Doctor Trainee Other/ None (non-clinical staff, friend/family, other laboring women)
	Staff member present at time of delivery (categorical)	Nurse/midwife (reference) Doctor Trainee Other (non-clinical staff, friend/family, other laboring women)
Delivery characteristics	Mode of delivery (categorical)	Vaginal (reference) Cesarean Other/Unknown
	Presence of birth companion during labor/delivery (binary)	No (reference) Yes
	Birth companion classification (categorical)	Husband/male partner, family member, friend, doula, traditional birth attendant (TBA), other
	Time of delivery (binary)	Day (reference) Night
	Day of delivery (binary)	Weekday (reference) Weekend

Individual Characteristics

The following sociodemographic and obstetric history covariates were obtained from the Admission Form in the WHO labor observation tool:

Age: Maternal age was analyzed in three categories: 15-19 years, 20-29 years (reference category), and 30 years and older. There was no missing data on this variable.

Education Level: Maternal education was defined categorically as: none/pre-primary/primary, secondary (reference category), post-secondary or higher, and vocational/other. To be consistent across the three countries, secondary education was selected as the reference category as none/primary education was low in Nigeria. Missing data for this variable was low at 0.3%.

Marital status: Current marital status was assessed as currently married or cohabiting (reference) versus not married (single, separated, divorced, widowed, or other); less than 1% (0.9%) of women had either "unknown" or missing marital status.

Number of previous births: This variable was calculated as the number of previous births *not* including the most recent and was assessed by the question asking about number of previous pregnancies. It was categorized as: none (no births prior to the most recent one), 1, and 2 or more. No previous births was the reference category; 0.3% of observations were missing data on this variable.

Provider Characteristics

The following covariates related to provider characteristics were obtained from the WHO labor observation tool's Childbirth Form:

Primary labor attendant: This variable was assessed in four categories, though was only modeled as a 3-category variable given the low frequency of "none/other": nurse/midwife (reference category), doctor (obstetrician or other resident physician), trainee (medical, nursing,

or midwifery student), and none/other (where "other" included other clinical (health attendants) or non-clinical staff (cleaners), other laboring women, or family members/friends). "None" was included in this variable and not as a mistreatment item; only not having a staff member present at the actual time of delivery was scored in the Unsupportive Birth Environment Index. Missing data on this variable was 0.96%.

Staff member present at delivery: This covariate was categorized as: nurse/midwife (reference category), doctor (obstetrician or other resident physician), trainee (medical, nursing, or midwifery student), and other (those included non-clinical staff, other laboring women, family members/friends). The denominator for the variable was restricted to only women who had someone present at delivery (n=1873); as mentioned above, no staff present counted as a mistreatment item on the Unsupportive Birth Index Item. It was constructed from multiple binary variables assessing whether specific staff members or others were present at delivery; the final variable was coded based on the highest ranking staff member present (e.g., if both a trainee and a nurse/midwife were present, the covariate was coded as "nurse/midwife"). Given the low frequency of trainees present at delivery in Nigeria and Ghana, this variable was assessed as a binary in the models for these two countries (nurse/midwife (reference) versus doctor). Missing data on this item was less than 0.01%.

Delivery Characteristics

Covariates related to the delivery were also obtained from the Childbirth Form in the WHO labor observation tool:

Mode of delivery: This covariate was assessed as a binary variable: vaginal (included assisted, unassisted, and breach) versus Cesarean (including laparotomy). Vaginal delivery was the reference category, and 1.1% of women had unknown or missing data on delivery mode.

Companion present: This variable was dichotomous, assessed as whether a woman had a companion present during either labor, delivery, or both. Not having a companion was the reference category. There was no missing data on this variable.

Time of delivery: Time of delivery was assessed as day (defined as 8:00am-5:00pm) versus night (defined as 5:01pm-7:59 am), with daytime delivery set as the reference category. There was no missing data for this variable.

Day of delivery: This covariate was assessed dichotomously as weekday delivery (reference category) versus weekend delivery, with weekday delivery as the reference category. There were no missing data for this variable.

Missing Data

Among covariates with any missing data, missingness was very low (≤1%). To retain as many observations as possible in the analysis, missing data on education level, marital status, number of previous births, primary labor attendant, staff present at birth, and delivery mode were imputed using single hot-deck imputation.

3.6.3 Analytic Methods

Mistreatment was operationalized as "high" mistreatment scores (coded as "1") on the Interpersonal Abuse Scale, Exams & Procedures Index, and Unsupportive Birth Environment Index, meaning scores were higher than the country-specific mean score versus "low" mistreatment scores, those at or below the country-specific mean (coded as "0"). The code of "0" on the outcome does *not* necessarily mean that women scored a zero on the mistreatment measure, and thus results are not interpreted as factors associated with "any" mistreatment versus "no" mistreatment. Scores were analyzed in this way rather than as continuous scores to aid with interpreting and contextualizing results; assigning cut-points that are country-specific allows us

to assess the factors in each setting associated with above-average (i.e., higher levels) of mistreatment on each measure [166].

Descriptive bivariate distributions of the individual, provider, and delivery characteristics outlined in the previous section were calculated by country and mistreatment measure. Differences in the percentage of women with higher and lower levels of mistreatment by tge individual, provider, and delivery characteristics were assessed.

Bivariable and multivariable fixed effects logistic regression models adjusting for clustering in facilities were run separately by country and mistreatment measure to assess the relationship between individual-, provider-, and delivery-level factors and mistreatment. In multivariable analysis, a block-modelling approach was used by adding covariates representing the factors in a step-wise fashion. All multivariate models accounted for clustering at the facility-level through incorporating fixed effects for the facility. Multicollinearity was assessed using a variance of inflation factors (VIF) cutoff value of below 10. Multivariate models were conducted as follows:

Model 1: individual covariates (age+ education level+ marital status+ parity)

(4) $\text{Logit}[\frac{\Pr(Y=1)}{\Pr(Y=0)}] = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_{,4} + \alpha_i$

Y= level of mistreatment (1= “high score”; 0= “low score”)
X_1= age (categorical)
X_2= education level (categorical)
X_3= marital status (categorical)
X_4= parity (categorical)
α_i= fixed effect for facility *i*
ε_i= individual random error term (assumed and known in logistic regression, not shown)
e^{β_x}= Odds ratio of having a “high” level of mistreatment compared to “low” per unit increase in covariate X, adjusting for all other covariates

Model 2: individual covariates+ provider covariates (primary labor attendant + staff member presence at time of delivery)

$$(5)\ \text{Logit}[\frac{\Pr(Y=1)}{\Pr(Y=0)}] = \textbf{Model 1} + \beta_5 x_5 + \beta_6 x_6 + \alpha_i$$

Y= level of mistreatment (1= "high score"; 0= "low score")
X_5= primary attendant during facility stay (categorical)
X_6= staff member present at time of delivery (categorical)

Model 3: individual covariates+ provider covariates + delivery covariates (mode of delivery+ presence of birth companion+ day of week of delivery+ time of delivery)

$$(6)\ \text{Logit}\left[\frac{\Pr(Y=1)}{\Pr(Y=0)}\right] = \textbf{Model 2} + \beta_7 x_7 + \beta_8 x_8 + \beta_9 x_9 + \beta_{10} x_{1o} + \alpha_i$$

Y= level of mistreatment (1= "high score"; 0= "low score")
X_7= presence of a birth companion (binary)
X_8= delivery mode (categorical)
X_9= day of week of delivery (binary: weekday/weekend)
X_{10}= time of delivery (binary: day/night)

3.7 SENSITIVITY ANALYSES

Four sensitivity analyses were conducted in addition to the sensitivity analyses described above related to the iterative development of the three mistreatment measures. First, mistreatment items that included "don't know" or "not applicable" options that were originally coded as "0=no mistreatment" on those items to yield the most conservative estimates were recoded as "1=mistreatment" to yield the most inflated mistreatment estimates. Responses in these categories were also omitted to determine the impact of these structural changes on item inclusion in the final measures. Measure score distributions and performance assessments (**Appendix 2a-2c**) and correlations between measures (**Appendices 6a-6c)** were calculated at the facility-level, rather than the country-level, to assess the level of heterogeneity in item and measure performance by facility. In the risk factors analysis, multivariate fixed effects linear regression models were run to analyze mistreatment as continuous scores to assess if and how the results from this approach differed from those for the dichotomous measures. Standard

logistic regression (i.e., without fixed effects) were also run to assess the extent to which the fixed effects models with such a small number of facilities in each country inflated the design effect and reduced the estimate of odds ratios (**Appendix 9**).

3.8 ETHICAL CONSIDERATIONS

This study was exempted by the Institutional Review Board at the Johns Hopkins Bloomberg School of Public Health as it was a secondary analysis of existing de-identified data. Data access was granted by the WHO RHR/HRP research team and the WHO Ethical Review Committee. The larger WHO study obtained approvals from the following entities: WHO Ethical Review Committee (WHO ERC): Protocol A65880, Guinea: Le comité national d'éthique pour la recherche en santé (National Ethics Committee for Health Research) (protocol number: 024/CNERS/15), Nigeria: Federal Capital Territory Health Research Ethics Committee (protocol ID, FHREC/2014/01/72/28-11-14), Oyo State Review Ethical Committees (protocol ID, AD 13/479), Ondo State Health Research Ethics Committee (protocol ID, AD4693/299), and Ghana: Ghana Health Service Ethical Review Committee (protocol ID, GHS-ERC:3).

3.9 REFERENCES

1. Ellsberg, M. and L. Heise. *2005: Researching Violence Against Women. A Practical Guide for Researchers and Activists*. in *by World Health Organization (WHO), Geneva. See also: www. path. org/files/GBV_rvaw_complete. pdf Marie-France Hirigoyen, 2006: Warum tust du mir das an? Gewalt in Partnerschaften*. 2005. Citeseer.
2. Hulton, L.A., Z. Matthews, and R.W. Stones, *Applying a framework for assessing the quality of maternal health services in urban India.* Social science & medicine, 2007. **64**(10): p. 2083-2095.
3. Hulton, L., et al., *Using evidence to drive action: A "revolution in accountability" to implement quality care for better maternal and newborn health in Africa.* International journal of gynecology & obstetrics, 2014. **127**(1): p. 96-101.
4. Sando, D., et al., *The prevalence of disrespect and abuse during facility-based childbirth in urban Tanzania.* BMC pregnancy and childbirth, 2016. **16**(1): p. 236.
5. Misago, C., et al., *From 'culture of dehumanization of childbirth' to 'childbirth as a transformative experience': changes in five municipalities in north-east Brazil.* Int J Gynaecol Obstet, 2001. **75**.

6. McMahon, S.A., et al., *Experiences of and responses to disrespectful maternity care and abuse during childbirth; a qualitative study with women and men in Morogoro Region, Tanzania.* BMC Pregnancy and Childbirth, 2014. **14**(1): p. 268.
7. Dey, A., et al., *Discordance in self-report and observation data on mistreatment of women by providers during childbirth in Uttar Pradesh, India.* Reproductive Health, 2017. **14**(1): p. 149.
8. Sando, D., et al., *Methods used in prevalence studies of disrespect and abuse during facility based childbirth: lessons learned.* Reproductive Health, 2017. **14**(1): p. 127.
9. Kruk, M.E., et al., *Disrespectful and abusive treatment during facility delivery in Tanzania: a facility and community survey.* Health Policy and Planning, 2014: p. czu079.
10. Bohren, M.A., et al., *The mistreatment of women during childbirth in health facilities globally: a mixed-methods systematic review.* PLoS medicine, 2015. **12**(6): p. e1001847.
11. Bohren, M.A., et al., *Methodological development of tools to measure how women are treated during facility-based childbirth in four countries: labor observation and community survey.* BMC medical research methodology, 2018. **18**(1): p. 132.
12. Bowser, D. and K. Hill, *Exploring evidence for disrespect and abuse in facility-based childbirth.* Boston: USAID-TRAction Project, Harvard School of Public Health, 2010.
13. Warren, C., et al., *Study protocol for promoting respectful maternity care initiative to assess, measure and design interventions to reduce disrespect and abuse during childbirth in Kenya.* BMC Pregnancy and Childbirth, 2013. **13**(1): p. 21.
14. DeVellis, R.F., *Scale development: Theory and applications*. Vol. 26. 2016: Sage publications.
15. Larson, E., et al., *When the patient is the expert: measuring patient experience and satisfaction with care.* Bulletin of the World Health Organization 2019 p. 1-13.
16. StataCorp LP, *Stata/MP 13.0*. 2013: College Station, TX.
17. Netemeyer, R.G., W.O. Bearden, and S. Sharma, *Scaling procedures: Issues and applications*. 2003: Sage Publications.
18. Smith, P.H., J.A. Earp, and R. DeVellis, *Measuring battering: development of the Women's Experience with Battering (WEB) Scale.* Women's health (Hillsdale, NJ), 1995. **1**(4): p. 273-288.
19. Baba, K.P., et al., *Factor Structure of the Conflict Tactics Scale 1.* Int J Community Based Nurs Midwifery, 2017. **5**(3): p. 239-247.
20. Kalokhe, A.S., et al., *The Development and Validation of the Indian Family Violence and Control Scale.* PLoS One, 2016. **11**(1): p. e0148120.
21. Marshall, L.L., *Development of the severity of violence against women scales.* Journal of family violence, 1992. **7**(2): p. 103-121.
22. Straus, M.A., *Measuring intrafamily conflict and violence: The conflict tactics (CT) scales.* Journal of Marriage and the Family, 1979: p. 75-88.
23. Straus, M.A., et al., *The revised conflict tactics scales (CTS2) development and preliminary psychometric data.* Journal of family issues, 1996. **17**(3): p. 283-316.
24. Dettrick, Z., et al., *Measuring Quality of Maternal and Newborn Care in Developing Countries Using Demographic and Health Surveys.* PLoS One, 2016. **11**(6): p. e0157110.
25. Tripathi, V., et al., *Development and Validation of an Index to Measure the Quality of Facility-Based Labor and Delivery Care Processes in Sub-Saharan Africa.* PLoS One, 2015. **10**(6): p. e0129491.

26. Wilhelm, D., et al., *Quality of maternal obstetric and neonatal care in low-income countries: development of a composite index.* BMC Med Res Methodol, 2019. **19**(1): p. 154.
27. de Vet, H.C., C.B. Terwee, and L.M. Bouter, *Current challenges in clinimetrics.* J Clin Epidemiol, 2003. **56**(12): p. 1137-41.
28. Bollen, K. and R. Lennox, *Conventional wisdom on measurement: A structural equation perspective.* Psychological bulletin, 1991. **110**(2): p. 305.
29. Streiner, D.L., *Being inconsistent about consistency: when coefficient alpha does and doesn't matter.* J Pers Assess, 2003. **80**(3): p. 217-22.
30. Bollen, K.A. and W.R. Davis, *Causal indicator models: Identification, estimation, and testing.* Structural Equation Modeling: A Multidisciplinary Journal, 2009. **16**(3): p. 498-522.
31. Fayers, P.M. and D.J. Hand, *Factor analysis, causal indicators and quality of life.* Qual Life Res, 1997. **6**(2): p. 139-50.
32. Fayers, P.M., et al., *Causal indicators in quality of life research.* Qual Life Res, 1997. **6**(5): p. 393-406.
33. OECD, *Handbook on constructing composite indicators: methodology and user guide*. 2008: OECD publishing.
34. Feinstein, A.R., *Clinimetric perspectives.* Journal of chronic diseases, 1987. **40**(6): p. 635-640.
35. Pirkle, C.M., et al., *Validity and reliability of criterion based clinical audit to assess obstetrical quality of care in West Africa.* BMC pregnancy and childbirth, 2012. **12**(1): p. 118.
36. Mokkink, L.B., et al., *COSMIN methodology for systematic reviews of patient-reported outcome measures (PROMs).* User manual, 2018. **78**: p. 1.
37. Prinsen, C.A., et al., *How to select outcome measurement instruments for outcomes included in a "Core Outcome Set"–a practical guideline.* Trials, 2016. **17**(1): p. 449.
38. Bollen, K., *Structural equations with latent variables.* New York: Wilev, 1989.
39. Clark, L.A. and D. Watson, *Constructing validity: Basic issues in objective scale development.* Psychological assessment, 1995. **7**(3): p. 309.
40. Jennings, L., et al., *Women's empowerment and male involvement in antenatal care: analyses of Demographic and Health Surveys (DHS) in selected African countries.* BMC Pregnancy Childbirth, 2014. **14**: p. 297.
41. Coltman, T., et al., *Formative versus reflective measurement models: Two applications of formative measurement.* Journal of Business Research, 2008. **61**(12): p. 1250-1262.
42. Terwee, C.B., et al., *Quality criteria were proposed for measurement properties of health status questionnaires.* J Clin Epidemiol, 2007. **60**(1): p. 34-42.
43. Afulani, P.A., et al., *Development of a tool to measure person-centered maternity care in developing settings: validation in a rural and urban Kenyan population.* Reprod Health, 2017. **14**(1): p. 118.
44. Afulani, P.A., et al., *Validation of the person-centered maternity care scale in India.* Reprod Health, 2018. **15**(1): p. 147.
45. Afulani, P.A., et al., *Toward the development of a short multi-country person-centered maternity care scale.* Int J Gynaecol Obstet, 2019. **146**(1): p. 80-87.
46. Vedam, S., et al., *Patient-led decision making: Measuring autonomy and respect in Canadian maternity care.* Patient Educ Couns, 2019. **102**(3): p. 586-594.

47. Vedam, S., et al., *The Giving Voice to Mothers study: inequity and mistreatment during pregnancy and childbirth in the United States.* Reprod Health, 2019. **16**(1): p. 77.
48. Sheferaw, E.D., T.Z. Mengesha, and S.B. Wase, *Development of a tool to measure women's perception of respectful maternity care in public health facilities.* BMC pregnancy and childbirth, 2016. **16**(1): p. 67.
49. Strobino, D.M. and G. Baruffi, *Evaluation of a measure of neonatal morbidity.* Medical care, 1984: p. 818-826.

CHAPTER 4: RESULTS

4.1 CHAPTER OVERVIEW

This chapter presents the results of this study. First, the study sample characteristics are presented for each country, including individual, provider, and delivery characteristics. Results for Aim 1 are reported related to developing the three mistreatment measures in Nigeria, Ghana, and Guinea in the following dimensions: interpersonal abuse, inappropriate conduct of exams & procedures, and unsupportive birth environment. Results include performance of the mistreatment measures (distribution of mistreatment items, mean scores, and score distributions of the final measures), results from psychometric analyses conducted to develop the Interpersonal Abuse Scale, results from construct validity analyses, and tests for reliability/internal consistency. For Aim 2, the multivariate results are presented to identify factors associated with mistreatment in each dimension. The aims of this study are reiterated below:

Study Aims:

Using labor observation data from the WHO Multi-Country Study on How Women are Treated During Childbirth, the specific aims for this study were to:

Aim 1: Develop a set of valid and reliable measures for mistreatment of women during facility-based childbirth, including the following dimensions: interpersonal abuse, inappropriate conduct of exams & procedures, and unsupportive birth environment, using samples of women in Nigeria, Ghana, and Guinea.

Aim 2: Identify individual-, provider-, and delivery-related factors associated with mistreatment during facility-based childbirth in Nigeria, Ghana, and Guinea using the measures developed and confirmed in Aim 1.

4.2 STUDY SAMPLE CHARACTERISTICS

Table 4.1 shows sociodemographic, provider, and delivery characteristics of the sample for each country. The average age at delivery was highest in Nigeria (29.3 years), where over half of women were aged 30 years or older. The sample from Guinea was markedly younger than

the samples for Nigeria or Ghana with an average age of 23.8 years and over a quarter of women were between 15-19 years of age. Women with no education or primary education were uncommon in Nigeria (5.4%), whereas nearly a third (32.1%) in Ghana and two-thirds (66.9%) in Guinea had primary or no education; by contrast, half (50.1%) of women in Nigeria had either post-secondary education or higher; this level was less common in Ghana (14.7%) and comparatively rare in Guinea (6.6%). The vast majority of women in Nigeria and Guinea were currently married (94.8% and 93.4%, respectively), while Ghana had the highest proportion of unmarried women (19.4%). The distribution of number of previous births was similar both within and between countries.

The majority of primary attendants throughout labor and delivery were nurse/midwives in all three countries, though Ghana had a lower proportion of nurse/midwife attendants (69.9%) and the highest proportion of doctors (15.7%) and trainees (11.5%) serving as primary attendants. In Nigeria, nurse/midwives were the most common staff member present during delivery (80%), and physician attendance at delivery was lowest in this sample (17.6%). About a quarter of births were attended by physicians in Ghana (24.1%) and Guinea (25.9%). Prevalence of Cesarean deliveries was lowest in Nigeria (6.6%) and highest in Ghana (16.1%). The proportion of women that had a companion present during labor and/or delivery was low across all three settings, with the highest proportion in Nigeria (19.2%) followed by Ghana (11.2%) and Guinea (10.1%); the majority of companions in Nigeria and Guinea were family members or friends, whereas most companions in Ghana were husbands/partners. In all three settings, time of delivery was evenly split between day and night, and approximately 75% of deliveries occurred during weekdays.

Table 4.1. Individual, Provider, and Delivery Characteristics of the Study Sample by Country

Country	Nigeria *n (%)*	Ghana *n (%)*	Guinea *n (%)*
Sample Size	**407**	**912**	**655**
Individual Characteristics			
Age (years)			
Mean (SD)	29.3 (5.4)	28.4 (5.9)	23.8 (5.6)
15-19	15 (3.7)	76 (8.3)	175 (26.7)
20-29	182 (44.7)	449 (49.2)	355 (54.2)
30+	210 (51.6)	387 (42.4)	125 (19.1)
Education Level			
None/ Primary	22 (5.4)	293 (32.1)	438 (66.9)
Secondary	176 (43.2)	462 (50.7)	152 (23.2)
Post-secondary or higher	204 (50.1)	134 (14.7)	43 (6.6)
Vocational or other	5 (1.2)	23 (2.5)	22 (3.4)
Marital status			
Married	386 (94.8)	735 (80.6)	612 (93.4)
Not married	21 (5.2)	177 (19.4)	43 (6.6)
Number of previous births			
0	163 (40.1)	343 (37.6)	235 (35.9)
1	110 (27.0)	249 (27.3)	143 (21.8)
2+	134 (32.9)	320 (35.1)	277 (42.3)
Provider Characteristics			
Primary labor attendant [a]			
Nurse/Midwife	360 (88.5)	458 (69.9)	762 (83.6)
Doctor	20 (4.9)	103 (15.7)	101 (11.1)
Trainee	22 (5.4)	75 (11.5)	37 (4.1)
None/Other	5 (1.2)	19 (2.9)	12 (1.3)
Staff member present at delivery [ab]			
Nurse/midwife	306 (81.4)	667 (74.5)	414 (68.8)
Doctor	66 (17.6)	216 (24.1)	156 (25.9)
Trainee	1 (0.3)	11 (1.2)	32 (5.3)
Other	3 (0.8)	1 (0.1)	--
Delivery Characteristics			
Mode of delivery			
Vaginal	380 (93.4)	765 (83.4)	563 (86.0)
Cesarean	27 (6.6)	147 (16.1)	92 (14.1)
Companion was present during labor and/or delivery	78 (19.2)	102 (11.2)	66 (10.1)
Type of companion present at delivery *(N=163)*	**n=51**	**n=82**	**n=31**
Husband/partner	21 (41.2)	62 (75.6)	--
Family/friend	26 (51.0)	20 (24.4)	30 (97.0)
Other	4 (7.8)	--	1 (3.2)
Time of delivery [c]			
Day	201 (49.4)	390 (42.8)	280 (42.8)

(cont.)

Night	206 (50.6)	522 (57.2)	375 (57.3)
Day of delivery			
Weekday	309 (75.9)	673 (73.8)	513 (78.3)
Weekend	98 (24.1)	239 (26.2)	142 (21.7)

Table 4.1

Abbreviations: SD=standard deviation. [a] Trainee= medical students, nursing students, midwifery students. [b] Among women with a staff member present at delivery.[c] "Day"= 8:00-17:00 (5:00pm); "Night"=17:01 (5:01pm)-7:59

4.3 AIM 1 RESULTS

4.3.1 Items Included for Analysis from Full Item Pool

Table 4.2 displays the original full 56-item pool assessed in the WHO labor observation tool, and indicates which items were retained in one of the final mistreatment measures; items that were combined are also noted.

Ten of the original 24 items from the physical abuse and verbal abuse domains were included for psychometric analysis during scale development. The majority of the original items were combined into fewer items rather than omitted to maintain as much content validity as possible. Ten items assessing physical abuse were combined into a single item about whether at least one form of physical abuse occurred. Three items assessing whether a woman received negative comments about 1) her physical appearance, 2) her baby's physical appearance, or 3) her sexual activity were combined into a single item about whether she received at least one of these comments. Similarly, a single item about whether the woman was threatened was constructed from four items assessing whether a woman as threatened with: 1) the use of physical violence, 2) the use of a medical procedure (e.g., episiotomy, Cesarean, or other procedure), 3) a poor outcome if she does not comply, or 4) withholding care from either her or her baby.

The 18 items in the failure to meet professional standards of care domain were combined into 7 items for analysis during index development. Twelve items related to whether a woman was informed *and* gave consent during the first vaginal exam and five different procedures

(Cesarean, episiotomy, hysterectomy, tubal ligation, and postpartum IUD insertion) were collapsed into a single item about informed consent; it was assessed as whether a woman was not informed *or* did not give consent during any first vaginal exam or any procedure. A single item about pain relief was constructed from two separate items assessing whether a woman was 1) offered a form of pain relief, or 2) not given pain relief if she requested it.

All 5 items under the domain related to poor rapport/communication between women and providers were included in the analysis during index development. Within the health systems conditions and constraints domain, four items were included in index development. The set of items about whether curtains or partitions were used to provide privacy and whether a woman had a bed that were assessed during three separate time periods (labor, childbirth, and postpartum) were collapsed to yield two items about whether these events occurred *at any time*.

Table 4.2. Full Mistreatment Item Pool from the WHO Labor Observation Tool, by WHO Mistreatment Typology Domain and Final Mistreatment Measure

Item	Included in a Final Measure	Combined Item Description	Final Mistreatment Measure
Physical abuse			
1. Pinched			
2. Kicked			
3. Slapped			
4. Punched			
5. Hit with an instrument			
6. Gagged			
7. Physically tied to bed			
8. Held down to the bed forcefully			
9. Forceful downward pressure			
10. Other use of physical force			
Experienced at least one form of physical abuse	✓	Any instance of at least one item above (#1-#10)	Interpersonal Abuse Scale
Verbal abuse			
11. Shouted or screamed at	✓		Interpersonal Abuse Scale
12. Insulted	✓		Interpersonal Abuse Scale
13. Scolded	✓		Interpersonal Abuse Scale
14. Mocked	✓		Interpersonal Abuse Scale
15. Hissed	X		

Item	Included in a Final Measure	Combined Item Description	Final Mistreatment Measure
16. Negative comments about her physical appearance (including her weight, genitalia, cleanliness, or other aspects of a woman's body) 17. Did the woman receive negative comments about the baby's physical appearance (including his/her appearance, sex, or other aspects of the baby) 18. Receive comments about her sexual activity			
Woman received any negative comments	✓	Received at least one negative comment (#16-#18)	Interpersonal Abuse Scale
19. Threatened with use of a medical procedure (such as episiotomy, Cesarean or other procedure) 20. Threatened with physical violence 21. Threatened that if she does not comply, her or her baby will have a poor outcome 22. Threatened with withholding care from her or her baby			
Was the woman threatened	✓	Received at least one threat (#19-#22)	Interpersonal Abuse Scale
23. Woman blamed for her or her baby's poor health outcomes	X		
24. Other forms of verbal abuse	✓		Interpersonal Abuse Scale
Failure to meet professional standards of care Staff member did **not** inform woman why a procedure performed was needed: 25. Cesarean 26. Episiotomy 27. Hysterectomy 28. Tubal ligation 29. Postpartum IUD insertion Staff member did **not** obtain woman's permission before performing any of the following procedures: 30. Cesarean 31. Episiotomy 32. Hysterectomy 33. Tubal ligation 34. Postpartum IUD insertion 35. Staff member informed the woman of why a vaginal examination was needed 36. Staff member obtained woman's permission before vaginal examination			
Staff member 1) informed the woman why a procedure or first vaginal exam performed was needed, and 2) obtained her permission for it	✓	At least one instance of #25-#36	Exams & Procedures Index

Item	Included in a Final Measure	Combined Item Description	Final Mistreatment Measure
37. Staff member conducted a vaginal examination in a way that others (patients, visitors, non-medical staff) could see her breasts/genitalia	✓		Exams & Procedures Index
38. Staff member discussed the woman's private health information in a way that others (non-medical staff, other patients or other patients' family members) could hear?	✓		Exams & Procedures Index
39. Woman was offered any form of pain relief?			
40. Woman was given pain relief (among those that requested it)?			
*Woman was **not** offered form of pain relief **or** given pain relief if she requested it*	✓	Either #39 or #40	Unsupportive Birth Environment Index
41. Woman requested medical attention from a health worker that was not responded to	✓		Unsupportive Birth Environment Index
42. No staff member was present when the baby came out	✓		Unsupportive Birth Environment Index
Poor rapport/communication between women and providers			
43. An interpreter was not used (if primary attendant did not speak same language as woman)	✓		Unsupportive Birth Environment Index
44. Woman did not have easy access to water or oral fluids	✓		Unsupportive Birth Environment Index
45. Woman was not told she could mobilize during labor	✓		Unsupportive Birth Environment Index
46. Woman was not offered to have a birth companion	X		
47. Woman was not asked her preferred birthing position	X		
Health systems conditions/constraints			
48. No curtains, partition, or other measures used to provide privacy for the woman during labor (prior to childbirth)			
49. No curtains, partition, or other measures used to provide privacy for the woman during labor (prior to childbirth) as the baby was coming out, through the delivery of the placenta?			
50. No curtains, partition, or other measures used to provide privacy for the woman during labor (prior to childbirth) during the postpartum period			
No curtains/partitions used to provide privacy during any period (labor, delivery, or postpartum)	✓	At least one instance of #48-#50	Unsupportive Birth Environment Index

Item	Included in a Final Measure	Combined Item Description	Final Mistreatment Measure
51. Woman had a bed during labor			
52. Woman had a bed during childbirth			
53. Woman had a bed during the postpartum period			
Woman did not have a bed during any period (labor, childbirth, or postpartum)	✓	At least one instance of #51-#53	Unsupportive Birth Environment Index
54. At any time, did the woman had to share a bed with another woman or women	✓		Unsupportive Birth Environment Index
55. At any time, did staff suggest or ask the woman (or companion) for a bribe, informal payment or gift	✓		Unsupportive Birth Environment Index
56. At any time, was the woman was instructed to clean up blood, urine, feces, or amniotic fluid?	✓		Unsupportive Birth Environment Index

Table 4.2
Note: Italics indicate a mistreatment item that has been constructed for the final mistreatment measures based on a combination of several original WHO labor observation tool items (indicated in grey text). All items with a symbol, either ✓ or X , in the "Included in Final Measure" column were included for analysis during measure development

4.3.2 Psychometric Analysis Results: Interpersonal Abuse Scale

Seven of the 10 items in the physical abuse and verbal abuse domains that were included in the analysis were retained during factor analysis in all three countries to yield the final Interpersonal Abuse Scale. An item about whether the woman was hissed at was dropped during expert consultations as it was deemed an item specific to the Nigerian context, which deviated from the goal of developing a global scale applicable across settings. The item regarding whether a woman was blamed for her or her baby's poor outcome was also dropped from the final scale due to very low frequency and low factor loading ($\lambda<0.40$). The 7 items were satisfactory for factor analysis in all settings based on a significant p-value ≤ 0.05 on Bartlett's test of sphericity and Kaiser-Meyer-Olin (KMO) measures of sampling adequacy >0.50 overall and for each item; the overall KMO was 0.75 in Nigeria, 0.61 in Ghana, and 0.76 in Guinea. Tetrachoric correlations ranged between 0.22-0.62 in Nigeria, 0.24-0.58 in Ghana, and 0.18-0.57 in Guinea,

though one pairwise correlation of <0.15 was observed between threatened and insulted in Ghana and between physical abuse and negative comments in Guinea (**Appendix 3**).

Principal Components Analysis (PCA)

The PCA indicated one dominant factor for extraction in all three countries based on a single component with an eigenvalue >1.0, the results of the scree plots ,and the graphical depictions of the parallel analyses (**Appendix 4**). In Guinea, a second component with an eigenvalue of 1.01, a borderline scree plot, and a significant increase in the proportion of variance explained by the second component suggested that while there was one dominant factor emerging in this sample, either a one- or two-factor solution could be appropriate; the results of the parallel analysis in Guinea suggested a one-factor model was the best fit, so one factor was extracted for all three countries.

Exploratory Factor Analysis (EFA)

Table 4.3 shows the results of EFA and internal reliability for the Interpersonal Abuse Scale. Factor analysis of the 7 items supported a one-factor structure as all items showed strong standardized factor loadings (λ>0.40) on the latent factor in all countries, providing evidence of a consistent factor structure and scale unidimensionality. As factor analysis was run on a one-factor model, factor rotation was not needed. While 3-4 items in each country had uniqueness values above the recommend value of 0.50, the high factor loadings and theoretical importance of the items to the interpersonal abuse dimension were prioritized to warrant retaining them in the final scale. In Nigeria, factor loadings ranged from 0.58-0.77. Four items had uniqueness around or below 0.50, and negative comments, threatened, and physical abuse all had uniqueness values of 0.60-0.68. Factor loadings in Ghana ranged from 0.46-0.84; four items had uniqueness values around ≤0.50 (shouted, insulted, mocked, and threatened), and three items demonstrated

uniqueness values 0.50 (scolded, negative comments, and physical abuse). In Guinea, item factor loadings ranged between 0.49-0.74, with three items showing uniqueness near or ≤0.50 (shouted, insulted, and mocked), and four items >0.50 (scolded, negative comments, threatened, physical abuse).

Internal Reliability

The Interpersonal Abuse Scale showed adequate internal consistency for reliability in Nigeria based on a KR-20 coefficient of 0.71, clearing the 0.70 benchmark recommended for scale development [142, 145]. However, the KR-20 values of 0.57 and 0.54 in Ghana and Guinea, respectively, did not provide evidence for strong internal consistency in these samples. Interitem correlations of the items in the tetrachoric matrices indicated internal consistency of this scale in all three countries, where a range of 0.15-0.50 is a criterion used as evidence of internal consistency for new measures in early scale development stages [142, 145, 165]. Interitem correlations ranged from 0.22- 0.60 in Nigeria, 0.29-0.60 in Ghana, and 0.18-0.57 in Guinea. However, there was one pairwise correlation in Ghana and Guinea that was <0.10: the correlation between insulted and threatened was 0.08 in Ghana, and the correlation between physical abuse and negative comments was 0.07 in Guinea (**Appendix 3**).

Table 4.3. Interpersonal Abuse Scale: Results of Exploratory Factor Analysis by Country

	Nigeria (N=407)		**Ghana (N=912)**		**Guinea (N=655)**	
Item (7 items)	**Factor Loading**	**Uniqueness**	**Factor Loading**	**Uniqueness**	**Factor Loading**	**Uniqueness**
1. Shouted/screamed at	0.77	0.41	0.84	0.29	0.68	0.54
2. Insulted	0.77	0.40	0.71	0.50	0.72	0.48
3. Scolded	0.72	0.48	0.48	0.77	0.58	0.67
4. Mocked	0.67	0.55	0.68	0.53	0.74	0.46
5. Negative comments	0.56	0.68	0.46	0.78	0.49	0.76
6. Threatened	0.64	0.60	0.69	0.53	0.50	0.75

7. Physical abuse [a]	0.58	0.67	0.64	0.60	0.55	0.70
Internal Reliability						
Kr-20 Coefficient	**0.71**		**0.57**		**0.54**	
Deleted Items						
1. Was the woman blamed for her or her baby's poor health outcomes?			*Omitted due to low frequency*			
2. Was the woman hissed at?			*Nigeria- specific item*			

Table 4.3

[a] Any physical abuse= at least one experience of the following: pinched, kicked, slapped, punched, hit with instrument, gagged, physically tied to the bed, held down to the bed forcefully, given forceful downward pressure on abdomen, other use of physical force

4.3.3 Index Finalization: Exams & Procedures Index and Unsupportive Birth Environment Index

All three items in the Exams & Procedures index were retained. Two items were dropped from the Unsupportive Birth Environment Index because they were nearly universally performed (>90%) in all three countries: 1) whether the woman was asked her preferred birth position and 2) whether the woman was offered to have a birth companion. These results indicated that the two items would not be informative in a measure distinguishing between women who were and were not mistreated. Four items in this index were observed in <5% in all three countries, but were retained to cover as much content as possible in the unsupportive birth environment dimension: 1) no interpreter used (among women who spoke a different language than provider), 2) whether a woman was neglected, 3) whether a woman was directed to clean up blood or other fluids, and 4) whether a woman did not have bed at any time.

4.3.4 Final Three Measures of Mistreatment: Interpersonal Abuse Scale, Exams & Procedures Index, and Unsupportive Birth Environment Index

A set of three final measures of mistreatment were developed: a 7-item Interpersonal Abuse Scale, a 3-item Exams & Procedures Index, and an 11-item Unsupportive Birth

Environment Index. Descriptions of the specific items by mistreatment measure are shown in **Table 3.2**, in Chapter 3.

The Interpersonal Abuse Scale includes the following items: 1) shouted/screamed at, 2) insulted, 3) scolded, 4) mocked, 5) received negative comments, 6) threatened, and 7) experienced at least one form of physical abuse (including pinched, kicked, slapped, punched, hit with an instrument, gagged, physically tied to the bed, held down to the bed forcefully, given forceful downward pressure on abdomen, or other use of physical force). The 3 items in the Exams & Procedures Index involve breaches in informed consent or privacy: 1) not obtaining informed consent prior to the first vaginal exam or before any procedure, 2) having a vaginal exam conducted in a way that the woman's breasts or genitals were exposed to others (non-medical staff, other patients, or other patient's family members), and 3) having a provider discuss a woman's confidential health information such that others could hear. The eleven items in the Unsupportive Birth Index are related to both labor/delivery support and the elements of the birthing environment: 1) pain relief (either not offered or denied if requested), 2) no interpreter used (if woman spoke different language than primary attendant), 3) no staff present at time of delivery, 4) neglect, 5) being asked for a bribe by staff, 6) being instructed to clean up blood or other bodily fluids, 7) not having easy access to fluids during labor, 8) not being told the woman could mobilize during labor, 9) no curtains or partitions used for privacy, 10) not having a bed at any time, 11) and sharing a bed with another woman (women) at any time.

4.3.5 Item Frequencies and Mistreatment Score Distributions

The distribution of mistreatment items and mean score are shown for the three resulting mistreatment measures by country in **Table 4.4.**

Interpersonal Abuse Scale

Both overall mean scale scores and frequencies of all 7 items in the Interpersonal Abuse Scale were highest in Nigeria and lowest in Ghana on the majority of items. The mean Interpersonal Abuse Scale score in Nigeria (N=407) was 1.8 (range 0-7); 48.2% of women scored above the country mean. A third (32.7%) of women in Nigeria scored a 0 on the scale, and half (50.9%) scored between 1-3; 4 women (1.0%) received the maximum scale score of 7 (**Table 4.5)**. The average score in Ghana (N=912) was 0.5 (range: 0-6), and 31.4% of women scored higher than Ghana's country-specific mean. The majority (68.6%) of women in Ghana scored a 0 on this scale, 17.0% scored 1 and 8.9% scored 2; none received the maximum scale score of 7 (**Table 4.6)**. Guinea's (N=655) average score was 0.7 (range: 0-7). As in Ghana, most (60.2%) women received a scale score of 0, nearly a quarter (23.8%) scored 1, and 10.2% scored 2; 1 (0.7%) woman received the maximum score of 7 (**Table 4.7)**.

The most frequent Interpersonal Abuse Scale item in all three countries was being shouted/screamed at, followed by any physical abuse and being scolded. All these items occurred most frequently in Nigeria (52.2 % shouted/screamed, at, 27.0% physical abuse, and 26.5% scolded). While the frequency of being shouted/screamed at was similar in Ghana and Guinea (20.7% and 21.2%, respectively), observed physical abuse and scolding were markedly higher in Guinea; nearly double the proportion of women in Guinea experienced at least one form of physical abuse than in Ghana (15.9% versus 8.1%), and 11.9% of women in Guinea were scolded compared to 8.1% in Ghana.

Table 4.4. Distribution of Mistreatment Items by Measure and Country (N=1,974, unless otherwise noted)

Sub-Index Item	Nigeria (n=407) %	Ghana (n=912) %	Guinea (n=655) %
Interpersonal Abuse Scale (7 items)			
1. Shouted/screamed at	52.6	20.7	21.2
2. Insulted	20.2	2.9	2.8
3. Scolded	26.5	8.1	11.9
4. Mocked	21.4	2.4	7.9
5. Negative comments [a]	11.6	5.4	2.3
6. Threatened [b]	16.5	5.9	3.4
7. Physical abuse [c]	27.0	8.1	15.9
Mean Scale Score (± SD)	1.8 (1.8)	0.5 (1.0)	0.7 (1.0)
Max: 7 points	*[range: 0-7]*	*[range: 0-6]*	*[range: 0-7]*
% of women > country mean	48.2	31.4	39.9
Exams & Procedures Index (3 items) (N=1,538)	**(N=350)**	**(N=797)**	**(N=391)**
1. No Informed consent	78.6	72.5	50.1
2. Exposed	75.7	6.7	28.9
3. Confidential information	47.4	4.1	9.7
Mean Index Score (± SD)	2.0 (0.97)	0.8 (0.60)	0.9 (0.78)
Max: 3 points	*[range: 0-3]*	*[range: 0-3]*	*[range: 0-3]*
% of women > country mean	38.9	74.3	66.8
Unsupportive Birth Environment Index (11 items)			
1. No Pain relief	92.9	86.1	87.5
2. No interpreter	0.7	1.3	0.3
3. No staff present at birth	7.6	1.9	8.1
4. Neglected	1.5	0.2	0.8
5. Bribe	3.4	0.7	6.4
6. Clean up blood/fluids	1.5	--	0.2
7. Fluids	43.0	43.6	30.8
8. Mobilize	93.6	75.9	19.1
9. No curtains/partitions	88.5	15.1	63.5
10. No bed	1.2	0.9	4.6
11. Shared bed	0.3	1.2	21.8
Mean Index Score (± SD)	3.3 (0.78)	2.3 (1.0)	2.4 (1.1)
Max: 11 points	*[range: 1-6]*	*[range: 0-5]*	*[range: 0-6]*
% of women > country mean	41.8	44.9	42.6

Table 4.4

[a]Assessed as: Did the woman receive negative comments about: 1) her physical appearance (including her weight, genitalia, cleanliness, or other aspects of a woman's body), 2) her sexual activity, 3) or her baby's appearance (including his/her sex or other aspects of the baby)? [b]Assessed as: Was the woman threatened with: 1) physical violence, 2) a poor outcome for her or her baby, 3) withholding care from her or her baby, or 4) with the use of a medical procedure (such as episiotomy, Cesarean, or other procedure)? [c]Assessed as: Did the woman the woman experience at least one of the following?: pinched, kicked, slapped, punched, or hit with instrument, gagged,

physically tied to the bed, held down to the bed forcefully, given forceful downward pressure on abdomen, other use of physical force

Exams & Procedures Index

Of the 1,974 women in the sample, 1,538 were scored on the 3-item Exams & Procedures Index as they received at least one vaginal exam and/or at least one procedure (Cesarean, episiotomy, hysterectomy, tubal ligation, or postpartum IUD insertion). As with the Interpersonal Abuse Scale, the Nigerian sample (N=350) had the highest mean index score (2.0, range: 0-3), followed by Guinea (mean score: 0.89, range: 0-3) and was lowest in Ghana (mean score: 0.83, range: 0-3). The proportion of women scoring above their country-specific mean ranged widely from 38.9% in Nigeria to 66.8% in Guinea and 74.3% in Ghana. The vast majority of women (92%) in Nigeria scored between 1-3 on the index, with 38.9 receiving the maximum score of 3 (**Table 4.5**). In contrast, a quarter (25.7%) of women in Ghana scored 0, two-thirds scored 1, and only 2.1% scored 3 (**Table 4.6**). Similarly, the distribution of scores in Guinea were skewed to low scores, with a third (33.3%) of women scoring 0, 46.7% scoring , and 1.8% with the maximum scale score of 3 (**Table 4.7**).

Lack of informed consent was the most common form of mistreatment in all three countries, observed among approximately three-quarters of women in Nigeria (78.6%) and Ghana (72.5%) and half of women in Guinea (50.1%). Having breasts/genitals exposed during vaginal exams (75.7%) and private health information discussed so others could hear (47.4%) were much higher in Nigeria than the other two settings. Though having private health information discussed loudly was relatively infrequent in Ghana and Guinea (4.1% and 9.7%, respectively), nearly 30% of women in Guinea had their breasts/genitals exposed during exams compared to 6.7% in Ghana.

Unsupportive Birth Environment Index

The 11-item Unsupportive Birth Environment Index had the most variable item frequencies within and across countries. Nigeria again had the highest average index score (3.3, range: 1-6), and mean scores were similar in Ghana (N=797) and Guinea (N=391) (2.3 (range: 0-3) and 2.4 (range: 0-3), respectively). The proportion of women scoring above the country-specific mean was similar in the three countries, ranging from 41.8-44.9%. The majority (83.8%) of Nigerian women scored 3 or 4 on the index, whereas 69.7% and 62.8% scored between 2-3 in Ghana and Guinea, respectively. No woman in Nigeria received a score of 0 on this index, while 4.6% in Ghana and 2.4% in Guinea had a score of 0 (**Tables 4.5-4.7**).

Pain relief was almost universally not offered to women in any country. Moreover, women were not told they could mobilize during labor, and did not have curtains or partitions for privacy nearly universally in Nigeria (frequencies ranging from 88.5-93.6%). Forty-three percent of Nigerian women also did not have easy access to fluids. The remaining 7 index items occurred with much lower frequency, ranging from 0.3% (sharing a bed) to 3.4% of women being asked by facility staff for a bribe, to 7.6% (not having a staff member present at delivery). In Ghana, no offer or denial of pain relief (86.1%), women not being told they could mobilize (75.9%), and not having easy access to fluids (43.6%) were also the most common items, followed by 15.1% of women not having curtains or partitions. The remaining 7 items occurred with minimal frequency, all <2% , and where 1.2% shared a bed at some point during their facility stay and no women were instructed to clean up blood or other bodily fluids. The proportion of women delivering without a staff member present was lowest in Ghana of the three countries at 1.9%. In Guinea, pain relief (87.5%), no curtains or partitions (63.5%), and not having easy access to fluids (30.8%) were also the most frequent items. Nineteen percent of

women in Guinea were not told they could mobilize. Bed sharing was markedly higher in Guinea than in the other two countries at 21.8%, as were not having a bed (4.9%) and being asked for a bribe (8.1%).

4.3.6 Mistreatment Measure Performance

Table 4.8 provides selected statistics assessing overall measure performance (as opposed to item-specific performance discussed in the previous section), which varied widely across mistreatment measures and countries. The frequency for any items in the Interpersonal Abuse Scale did not exceed 90% in any country, but 2-3 items occurred in <5% in both Ghana and Guinea. While ≤1% of women had the maximum scale score in all countries, a third (32.7%) in Nigeria, 68.6% in Ghana, and 60.2% in Guinea had the minimum score of 0, indicating floor effects were present in all three settings. Similarly, 1 item in both Ghana and Guinea occurred in <5% of observations.

Ceiling effects were detected in Nigeria for the Exams & Procedures Index as 38.9% of women received the maximum index score, while floor effects were found in Ghana and Guinea where 25.7% and 33.3%of women, respectively, received the minimum score of 0. No floor or ceiling effects were seen in any country with the Unsupportive Birth Environment Index, though between 4-6 items were very infrequently observed (<5%) , and 1-3 items were nearly universally performed (>90%) in Nigeria and Ghana.

Table 4.5. Distribution of Scores by Mistreatment Measure, Nigeria (N=407, unless otherwise noted)

Mistreatment Item	Distribution of Mistreatment Scores *n (%)*											
	0	1	2	3	4	5	6	7	8	9	10	11
Interpersonal Abuse Scale (7 items)	133 (32.7)	78 (19.2)	77 (18.9)	52 (12.8)	28 (6.9)	23 (5.7)	12 (3.0)	4 (1.0)	--	--	--	--
Exams & Procedures Index (3 items) (n=350)	30 (8.6)	70 (20.0)	114 (23.6)	136 (38.9)	--	--	--	--	--	--	--	--
Unsupportive Birth Environment Index (11 items)	0 (0.0)	3 (0.7)	42 (11.3)	188 (46.2)	153 (37.6)	13 (3.2)	4 (1.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)

Table 4.6. Distribution Scores by Mistreatment Measure, Ghana (N=912, unless otherwise noted)

Mistreatment Item	Distribution of Mistreatment Scores *n (%)*											
	0	1	2	3	4	5	6	7	8	9	10	11
Interpersonal Abuse Scale (7 items)	626 (68.6)	155 (17.0)	81 (8.9)	35 (3.8)	10 (1.1)	4 (0.4)	1 (0.1)	0	--	--	--	--
Exams & Procedures Index (3 items) (n=797)	205 (25.7)	537 (67.4)	38 (4.8)	17 (2.1)	--	--	--	--	--	--	--	--
Unsupportive Birth Environment Index (11 items)	42 (4.6)	159 (17.4)	302 (33.1)	334 (36.6)	71 (7.8)	4 (0.4)	0	0	0	0	0	0

Table 4.7. Distribution of Scores by Mistreatment Measure, Guinea (N=655, unless otherwise noted)

Mistreatment Item	Distribution of Mistreatment Scores *n (%)*											
	0	1	2	3	4	5	6	7	8	9	10	11
Interpersonal Abuse Scale (7 items)	394 (60.2)	156 (23.8)	67 (10.2)	21 (3.2)	12 (1.8)	4 (0.6)	0	1 (0.2)	--	--	--	--
Exams & Procedures Index (3 items) (n=391)	130 (33.3)	182 (46.7)	72 (18.4)	7 (1.8)	--	--	--	--	--	--	--	--
Unsupportive Birth Environment Index (11 items)	16 (2.4)	110 (16.8)	250 (38.2)	161 (24.6)	93 (14.2)	23 (3.5)	2 (0.3)	0	0	0	0	0

Table 4.8. Descriptive Statistics of Mistreatment Measures by Country

	Mistreatment Measure								
	Interpersonal Abuse Scale			**Exams & Procedures Index**			**Unsupportive Birth Environment Index**		
	Nigeria (N=407)	**Ghana (N=912)**	**Guinea (N=655)**	**Nigeria (N=350)**	**Ghana (N=797)**	**Guinea (N=391)**	**Nigeria (N=407)**	**Ghana (N=912)**	**Guinea (N=655)**
Low Score (% of maximum possible)	0 (0.0)	0 (0)	0 (0.0)	0 (0.0)	0 (0)	0 (0.0)	1 (9.1)	0 (0)	0 (0.0)
High Score (% of maximum possible)	7 (100.0)	6 (85.7)	7 (100.0)	3 (100.0)	3 (100.0)	3 (100.0)	6 (54.5)	5 (45.5)	6 (54.5)
Range of item frequency									
# of items occurring in <5% of observations	0	2	3	0	1	1	6	4	4
# of items occurring in >90% of observations	0	0	0	0	0	0	3	1	0
Distribution of score									
% of women with minimum score	32.7	68.6	60.2	8.6	25.7	33.3	0.0	4.6	1.1
% of women with maximum score	1.0	0.0	0.2	38.9	2.1	1.8	0.0	0	0
Ceiling or floor effects present [a]	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No

Table 4.8

[a] "Ceiling or floor effects" were considered present if 15% of women had either the maximum or minimum score

4.3.7 Construct Validity: All Mistreatment Measures

Findings from the factor analysis demonstrated both high inter-item correlations and a similar and consistent factor structure for a unidimensional Interpersonal Abuse Scale in the three different country samples. These results provide evidence for high structural and cross-cultural validity, two important elements of construct validity.

The construct validity analyses via hypothesis testing examined crude bivariate regressions of labor/delivery and facility characteristics, global measures of satisfaction with care, and postpartum depression for each mistreatment measure. The results of these analyses were mixed and inconsistent across countries **(Tables 4.9-4.11)**. The results for assessment of the Interpersonal Abuse Scale indicated that increasing scale scores were associated with lower odds of nighttime delivery in Ghana (OR: 0.86, 95% CI: 0.75-0.98), counter to the hypothesis that the odds of mistreatment is higher at night. The odds did not differ by delivery time in either Nigeria or Guinea. There was a statistically significant correlation between higher scale scores and higher average monthly facility birth volume in Ghana, consistent with the hypothesized correlation, though the actual magnitude was low (Spearman-rank correlation: 0.08, $p \leq 0.05$).

In analysis of data subsets of linked labor observations and women's reports from the community survey, higher scale scores were associated with higher odds of women reporting dissatisfaction with their overall care experience in Ghana (OR: 1.54, 95% CI: 1.20-1.99) and Guinea (OR: 1.42, 95% CI: 1.08-1.85), but no significant association was observed in Nigeria; these results are mixed with regard to evidence of construct validity. The hypothesis that women's reports of any postpartum depressive symptoms are positively associated with interpersonal abuse also showed mixed results; higher odds of postpartum depressive symptoms were found in Guinea (OR: 1.26, 95% CI: 1.03-1.54) providing evidence for construct validity,

but lower odds with increasing scores in Nigeria (OR: 0.78, 95% CI: 0.63-0.95) and null results in Ghana (OR: 0.91, 95% CI: 0.71-1.16); these latter findings do not indicate strong construct validity of the scale **(Table 4.9)**.

The Exams & Procedures Index also had mixed construct validity results across settings. In Ghana, increasing index scores were associated with lower odds nighttime deliveries (OR: 0.76, 95% CI: 0.60-0.96), opposite the direction hypothesized, and no significant associations were found in Nigeria or Guinea. Similarly, higher odds of having a birth companion present with increasing index scores in Ghana (OR: 1.78, 95% CI: 1.27-2.48) were counter to the hypothesis that higher scores are associated with lower odds of having a companion. Higher odds of having a nurse/midwife as the primary labor attendant were found with increasing index scores in Nigeria and Guinea, suggesting good index construct validity (OR: 1.65, 95% CI: 1.18-2.30 and OR: 1.65, 95% CI: 2.46-1.78-3.40, respectively). Significant positive correlations between facility birth volume and higher index scores in Ghana (Spearman-rank correlation: 0.11, $p \leq 0.05$), and particularly in Guinea (Spearman-rank correlation: 0.57, $p \leq 0.05$) supported good construct validity, but a significant negative correlation in Nigeria (Spearman-rank correlation: -0.27 , $p \leq 0.05$) did not support this conclusion. Higher odds of postpartum depressive symptoms were seen with increasing index scores in Nigeria (OR: 1.47, 95% CI: 1.01-2.14), though no association was found in Ghana and Guinea (**Table 4.10**).

Evidence for construct validity was limited for the Unsupportive Birth Environment Index. As with the other measures, higher index scores in Ghana were associated with lower odds of nighttime delivery, counter to the hypothesized relationship (OR: 0.82, 95% CI: 0.72-0.94). In Guinea, higher odds of postpartum depressive symptoms were associated with increasing scores (OR: 1.28, 95% CI: 1.03-1.58) and a positive (though qualitatively low)

correlation with monthly facility birth volume (Spearman-rank correlation: 0.11 , p≤0.05) provides some evidence of construct validity in that setting, but the null results in Nigeria and Ghana do not suggest this index has strong construct validity across countries **(Table 4.11)**.

Table 4.9. Construct Validation Analysis: Bivariate Logistic Regressions of Labor/Delivery and Facility Characteristics[a], Measures of Satisfaction[b], and Postpartum Depression[b] on *Interpersonal Abuse Scale* Scores by Country

	Interpersonal Abuse Scale OR (95% CI)		
	Nigeria	**Ghana**	**Guinea**
Day of delivery [a]			
Weekday	*ref*	*ref*	*ref*
Weekend	1.12 (0.98-1.26)	0.97 (0.83-1.13)	1.12 (0.95-1.34)
Time of delivery [a]			
Day	*ref*	*ref*	*ref*
Night	0.98 (0.88-1.09)	**0.86*** **(0.75-0.98)**	1.06 (0.91-1.23)
Birth companion present during labor and/or delivery [a]			
No	*ref*	*ref*	*ref*
Yes	1.09 (0.95-1.25)	1.20 (0.99-1.46)	1.25 (1.00-1.54)
Primary labor attendant [a]			
Doctor, trainee, or other	*ref*	*ref*	*ref*
Nurse/midwife	0.93 (0.78-1.10)	1.03 (0.85-1.24)	0.96 (0.81-1.14)
Overall satisfaction with care [b]			
Satisfied/neutral	*ref*	*ref*	*ref*
Dissatisfied	0.99 (0.81-1.22)	**1.54*** **(1.20-1.99)**	**1.42*** **(1.08-1.85)**
Intend to deliver in same facility for future delivery [b]			
No	*ref*	*ref*	*ref*
Yes	0.90 (0.75-1.07)	0.89 (0.74-1.06)	**0.76*** **(0.60-0.96)**
Postpartum Depression [b]			
None	*ref*	*ref*	*ref*
Any	**0.78*** **(0.63-0.95)**	0.91 (0.71-1.16)	**1.26*** **(1.03-1.54)**

Correlation with average monthly facility volume [a]	0.04	**0.08***	0.02

Table 4.9

[a] Based on labor observations from full dataset (Nigeria: N=407; Ghana: N=912; Guinea: N-655)

[b] Based on women's reports from subset of linked labor observation and community survey data (Nigeria: N=331; Ghana: N=771; Guinea: N=423)

* p≤0.05

Table 4.10. Construct Validation Analysis: Bivariate Logistic Regressions of Labor/Delivery and Facility Characteristics[a], Measures of Satisfaction[b], and Postpartum Depression[b] on *Exams & Procedures Index* Scores by Country

	Exams & Procedures Index OR (95% CI)		
	Nigeria	**Ghana**	**Guinea**
Day of delivery [a]			
Weekday	*ref*	*ref*	*ref*
Weekend	1.14 (0.88-1.49)	1.10 (0.85-1.43)	0.91 (0.66-1.27)
Time of delivery [a]			
Day	*ref*	*ref*	*ref*
Night	0.93 (0.75-1.15)	**0.76*** **(0.60-0.96)**	1.09 (0.84-1.42)
Birth companion present during labor and/or delivery [a]			
No	*ref*	*ref*	*ref*
Yes	0.92 (0.71-1.21)	**1.78*** **(1.27-2.48)**	1.09 (0.76-1.57)
Primary Birth Attendant [a]			
Doctor, trainee, or other	*ref*	*ref*	*ref*
Nurse/midwife	**1.65**** **(1.18-2.30)**	1.24 (0.90-1.70)	**2.46*** **(1.78-3.40)**
Overall satisfaction with care [b]			
Satisfied/neutral	*ref*	*ref*	*ref*
Dissatisfied	1.00 (0.69-1.46)	0.96 (0.52-1.75)	0.73 (0.33-1.60)
Intend to deliver in same facility for future delivery [b]			
No	*ref*	*ref*	*ref*
Yes	0.72 (0.61-1.05)	1.08 (0.79-1.47)	1.09 (0.63-1.86)
Postpartum Depression [b]			
None	*ref*	*ref*	*ref*
Any	**1.47*** **(1.01-2.14)**	1.04 (0.70-1.55)	0.95 (0.64-1.41)

Correlation with average monthly facility volume [a]	**-0.27***	**0.11***	**0.57***

Table 4.10

[a] Based on labor observations from full dataset (Nigeria: N=407; Ghana: N=912; Guinea: N-655)

[b] Based on women's reports from subset of linked labor observation and community survey data (Nigeria: N=331; Ghana: N=771; Guinea: N=423)

* p≤0.05

Table 4.11. Construct Validation Analysis: Bivariate Logistic Regressions of Labor/Delivery and Facility Characteristics[a], Measures of Satisfaction[b], and Postpartum Depression[b] on Unsupportive Birth Environment Index Scores by Country

	Unsupportive Birth Environment Index OR (95% CI)		
	Nigeria	**Ghana**	**Guinea**
Day of delivery [a]			
Weekday	*ref*	*ref*	*ref*
Weekend	1.13 (0.84-1.51)	0.91 (0.79-1.06)	0.98 (0.83-1.15)
Time of delivery [a]			
Day		*ref*	*ref*
Night	1.08 (0.84-1.38)	**0.82*** **(0.72-0.94)**	1.12 (0.97-1.29)
Birth companion present during labor and/or delivery [a]			
No	*ref*	*ref*	*ref*
Yes	1.01 (0.74-1.38)	1.00 (0.81-1.22)	1.11 (0.88-1.38)
Primary Birth Attendant [a]			
Doctor, trainee, or other	*ref*	*ref*	*ref*
Nurse/midwife	1.06 (0.71-1.57)	1.14 (0.96-1.36)	0.91 (0.78-1.06)
Overall satisfaction with care [b]			
Satisfied/neutral	*ref*	*ref*	*ref*
Dissatisfied	0.96 (0.60-1.54)	0.96 (0.70-1.32)	1.26 (0.91-1.74)
Intend to deliver in same facility for future delivery [b]			
No	*ref*	*ref*	*ref*
Yes	1.35 (0.88-2.08)	1.01 (0.84-1.20)	0.78 (0.60-1.02)
Postpartum Depression [b]			
None	*ref*	*ref*	*ref*
Any	0.71 (0.47-1.06)	1.00 (0.81-1.24)	**1.28*** **(1.03-1.58)**

Correlation with average monthly facility volume [a]	0.03	0.03	**0.14***

Table 4.11

[a] Based on labor observations from full dataset (Nigeria: N=407; Ghana: N=912; Guinea: N-655)

[b] Based on women's reports from subset of linked labor observation and community survey data (Nigeria: N=331; Ghana: N=771; Guinea: N=423)

* $p \leq 0.05$

4.3.8 Reliability: Internal Consistency Analysis

Tables 4.12-4.14 show the distribution of the number of co-occurring items for each item for the three mistreatment measures separately by country. Every item in each measure across all three countries occurred with at least one or more other items in the measure, indicating internal consistency among the items in all three mistreatment measures particularly for the Interpersonal Abuse Scale and the Unsupportive Birth Environment Index. The Exams & Procedures Index shows the most limited internal consistency. While there appears to be strong consistency in Nigeria, in Ghana, 90.8% of women who lacked informed consent did not also have second item in the index. In Guinea , the majority of observations for women who were not given informed consent (63.3%) as well as for those where private health information was loudly discussed (55.3%) did not have another item in the index.

An examination of the proportion of women with a specific observed mistreatment item stratified by mistreatment score was also conducted. The results shown in **Table 4.15** indicate that the measure scores were internally consistent, both when scores were assessed as a binary, high/low (**Table 4.15**), and continuously (**Appendices 7a-7c**). The proportion of women with an observed item was greater for those with "high" scores than "low scores" for every item in all measures across settings. This finding indicates that the scores consistently distinguished between "high" and "low" levels of mistreatment. However, the proportion of women with high and low scores on the Unsupportive Birth Environment Index did not vary for the following

items due to low frequency: sharing a bed in Nigeria, no interpreter, neglected, asked for a bribe, instructed to cleanup blood/fluids, and not having a bed in Ghana, and no interpreter and instructed to cleanup blood/fluids in Guinea.

Table 4.16 displays low country-specific Spearman-rank correlations between each overall mistreatment measure. These findings support the theoretical approach to developing distinct measures to assess these three dimensions of mistreatment separately, rather than combining all items into a single composite measure.

Table 4.12. Distribution of Co-Occurring Mistreatment Items for Each Item by Measure, Nigeria (N=407)

Mistreatment Item	Number of Co-Occurring Items (%) [a]												
	0	1	2	3	4	5	6	7	8	9	10	**Total (n)**	**n (%) without item [b]**
Interpersonal Abuse Scale (7 items)													
Shouted	20.1	28.5	21.0	12.6	10.3	5.6	1.9	--	--	--	--	214	193 (47.4)
Insulted	7.3	13.4	14.6	20.7	24.4	14.6	4.9	--	--	--	--	82	325 (79.9)
Scolded	7.4	19.4	24.1	16.7	18.5	10.2	3.7	--	--	--	--	108	299 (73.5)
Mocked	3.5	20.7	25.3	16.1	17.2	12.6	4.6	--	--	--	--	87	320 (78.6)
Negative comments	2.1	17.0	25.5	17.0	17.0	12.8	8.5	--	--	--	--	47	360 (88.5)
Threatened	4.5	14.9	23.9	19.4	19.4	11.9	6.0	--	--	--	--	67	340 (83.5)
Physical abuse	12.7	22.7	20.9	13.6	15.5	10.9	3.6	--	--	--	--	110	297 (73.0)
													n (%) scoring 0
Total Score (%) | women with score of ≥ 1	--	28.2	28.2	19.4	9.9	8.4	4.4	1.5	--	--	--	273	134 (32.9)
Exams & Procedures Index (3 items) (N=350)													**n (%) without item [b]**
Informed consent	18.2	32.4	49.5	--	--	--	--	--	--	--	--	275	75 (21.4)
Exposed	7.2	41.5	51.3	--	--	--	--	--	--	--	--	265	85 (24.5)
Confidential information	0.60	17.5	81.9	--	--	--	--	--	--	--	--	166	184 (52.3)
										--	--		**n (%) scoring 0**
Total Score (%) | women with score of ≥ 1	--	20.0	32.6	38.9	--	--	--	--	--	--	--	320	30 (8.6)
Unsupportive Birth Environment Index (11 items)													**n (%) without item [b]**
Pain relief	--	8.5	47.1	40.0	3.4	1.1	--	--	--	--	--	378	29 (7.1)
No interpreter	--	--	--	33.3	--	66.7	--	--	--	--	--	3	404 (99.3)
No staff present at birth	--	3.2	32.3	25.8	29.0	9.7	--	--	--	--	--	31	376 (92.4)
Neglect	--	--	--	50.0	33.3	16.7	--	--	--	--	--	6	401 (98.5)
Bribe	--	--	14.3	64.3	14.3	7.1	--	--	--	--	--	14	393 (96.6)
Clean up blood/fluids	--	--	16.7	33.3	33.3	16.7	--	--	--	--	--	6	401 (98.5)
Fluids	--	--	14.5	78.3	5.7	1.1	--	--	--	--	--	175	232 (57.0)
Mobilize	0.5	7.4	47.8	39.9	3.4	1.1	--	--	--	--	--	381	26 (6.4)
No curtains/partitions	0.3	8.3	45.8	41.1	3.3	1.1	--	--	--	--	--	360	47 (11.6)
No bed	--	20.0	--	--	20.0	40.0	20.0	--	--	--	--	5	402 (98.8)
Shared bed	--	--	--	--	100.0	--	--	--	--	--	--	1	406 (99.8)
													n (%) scoring 0
Total Score (%) | women with score of ≥ 1	--	0.7	11.3	46.2	37.6	3.2	1.0	--	--	--	--	407	0 (0.0)

Table 4.12

[a] Proportions sum by row. [b] Proportions sum by column

Table 4.13. Distribution of Co-Occurring Mistreatment Items for Each Item by Sub-Index, Ghana (N=912)

Mistreatment Item	Number of Co-Occurring Items (%) [a]											Total (n)	n (%) without item [b]
	0	1	2	3	4	5	6	7	8	9	10		
Interpersonal Abuse Scale (7 items)													
Shouted	42.9	33.3	15.9	5.3	2.1	0.5	--	--	--	--	--	189	723 (79.3)
Insulted	15.4	11.5	42.3	23.1	3.9	3.9	--	--	--	--	--	26	886 (97.2)
Scolded	31.1	36.5	23.0	6.8	2.7	--	--	--	--	--	--	74	838 (91.9)
Mocked	9.1	31.8	31.8	9.1	13.6	4.6	--	--	--	--	--	22	890 (97.6)
Negative comments	32.7	36.7	14.3	8.2	6.1	2.0	--	--	--	--	--	49	863 (94.6)
Threatened	16.7	35.2	29.6	11.1	5.6	1.9	--	--	--	--	--	54	858 (94.1)
Physical abuse	27.0	33.8	23.0	9.5	5.4	1.4	--	--	--	--	--	74	838 (91.9)
													n (%) scoring 0
Total Score (%) | women with score of ≥ 1	--	54.2	28.5	12.0	3.5	1.4	0.4	--	--	--	--	284	628 (68.9)
Exams & Procedures Index (3 items) (n=350)													**n (%) without item [b]**
Informed consent	90.8	6.2	2.9	--	--	--	--	--	--	--	--	578	219 (27.5)
Exposed	11.3	56.6	32.1	--	--	--	--	--	--	--	--	53	744 (93.4)
Confidential information	18.2	30.3	51.5	--	--	--	--	--	--	--	--	33	764 (95.9)
													n (%) scoring 0
Total Score (%) | women with score of ≥ 1	--	90.7	6.4	2.9	--	--	--	--	--	--	--	592	205 (25.7)
Unsupportive Birth Environment Index (11 items)													**n (%) without item [b]**
Pain relief	13.5	35.0	41.9	9.0	0.5	--	--	--	--	--	--	785	127 (13.9)
No interpreter	--	25.0	33.3	33.3	8.3	--	--	--	--	--	--	12	900 (98.7)
No staff present at birth	--	17.7	11.8	58.8	11.8	--	--	--	--	--	--	17	895 (98.1)
Neglect	--	--	100.0	--	--	--	--	--	--	--	--	2	910 (99.8)
Bribe	--	--	50.0	50.0	--	--	--	--	--	--	--	6	906 (99.3)
Clean up blood/fluids	--	--	--	--	--	--	--	--	--	--	--	0	912 (100)
Fluids	2.8	12.1	66.8	17.3	1.0	--	--	--	--	--	--	398	514 (56.4)
Mobilize	5.2	36.9	47.3	10.1	0.6	--	--	--	--	--	--	692	220 (24.1)
No curtains/partitions	3.6	12.3	47.1	35.5	1.5	--	--	--	--	--	--	138	774 (95.9)
No bed	12.5	25.0	50.0	12.5	--	--	--	--	--	--	--	8	904 (99.1)
Shared bed	--	--	63.6	9.1	27.3	--	--	--	--	--	--	11	901 (98.8)
													n (%) scoring 0
Total Score (%) | women with score of ≥ 1	--	18.3	34.7	38.4	8.2	0.5	--	--	--	--	--	870	42 (4.6)

Table 4.13

[a] Proportions sum by row; [b] Proportions sum by column

Table 4.14. Distribution of co-occurring mistreatment items for each item by sub-index, Guinea (N=655)

Mistreatment Item	Number of Co-Occurring Items (%) [a]												
	0	1	2	3	4	5	6	7	8	9	10	Total (n)	n (%) without item [b]
Interpersonal Abuse Scale (7 items)													
Shouted	40.3	34.5	14.4	7.2	2.9	--	0.7	--	--	--	--	139	516 (78.8)
Insulted	11.1	27.8	11.1	38.9	5.6	--	5.6	--	--	--	--	18	637 (97.3)
Scolded	38.5	30.8	11.5	12.8	5.1	--	1.3	--	--	--	--	78	577 (88.1)
Mocked	25.0	25.0	28.9	11.5	7.7	--	1.9	--	--	--	--	52	603 (92.1)
Negative comments	26.7	40.0	6.7	13.3	6.7	--	6.7	--	--	--	--	15	640 (97.7)
Threatened	40.9	18.2	9.1	18.2	9.1	--	4.6	--	--	--	--	22	633 (96.6)
Physical abuse	40.4	32.7	13.5	8.7	3.9	--	1.0	--	--	--	--	104	551 (84.1)
													n (%) scoring 0
Total Score (%) | women with score of ≥ 1	--	60.0	26.5	6.9	4.6	1.5	--	0.4	--	--	--	260	395 (60.3)
Exams & Procedures Index (3 items) (n=350)													**n (%) without item [b]**
Informed consent	63.3	33.2	3.6	--	--	--	--	--	--	--	--	196	195 (49.9)
Exposed	32.7	61.1	6.2	--	--	--	--	--	--	--	--	113	278 (71.1)
Confidential information	55.3	26.3	18.4	--	--	--	--	--	--	--	--	38	353 (90.3)
													n (%) scoring 0
Total Score (%) | women with score of ≥ 1													
Unsupportive Birth Environment Index (11 items)													**n (%) without item [b]**
Pain relief	13.4	39.4	26.9	15.9	4.0	0.4	--	--	--	--	--	573	82 (12.5)
No interpreter	--	--	--	50.0	50.0	--	--	--	--	--	--	2	653 (99.7)
No staff present at birth	--	11.3	37.7	37.7	13.2	--	--	--	--	--	--	53	602 (91.9)
Neglect	--	--	--	60.0	40.0	--	--	--	--	--	--	5	650 (99.2)
Bribe	--	9.5	23.8	52.4	11.9	2.4	--	--	--	--	--	42	613 (93.6)
Clean up blood/fluids	--	--	--	--	100.0	--	--	--	--	--	--	1	654 (99.9)
Fluids	3.5	22.3	33.7	29.2	10.4	1.0	--	--	--	--	--	202	453 (69.2)
Mobilize	0.8	16.8	37.6	32.8	10.4	1.6	--	--	--	--	--	125	530 (80.9)
No curtains/partitions	5.8	37.7	30.5	20.7	4.8	0.5	--	--	--	--	--	416	239 (36.5)
No bed	3.3	3.3	23.3	20.0	40.0	10.0	--	--	--	--	--	30	625 (95.4)
Shared bed	1.4	17.5	15.4	39.2	24.5	2.1	--	--	--	--	--	143	512 (78.2)
													n (%) scoring 0
Total Score (%) | women with score of ≥ 1	--	17.2	39.1	25.2	14.6	3.6	0.3	--	--	--	--	639	16 (2.4)

Table 4.14

[a] Proportions sum by row. [b] Proportions sum by column

Table 4.15. Percent Distribution of Women Experiencing a Mistreatment Item by Mistreatment Score and Country

	Nigeria (N=407)		Ghana (N=912)		Guinea (N=655)	
Mistreatment Item	**Low Score**	**High Score**	**Low Score**	**High Score**	**Low Score**	**High Score**
Interpersonal Abuse Scale (7 items)						
Shouted	20.4	87.2	0.0	66.1	0.0	53.3
Insulted	2.8	38.8	0.0	9.1	0.0	6.9
Scolded	3.8	51.0	0.0	25.9	0.0	29.9
Mocked	1.4	42.9	0.0	7.7	0.0	19.9
Negative comments	0.5	23.5	0.0	17.1	0.0	5.8
Threatened	1.4	32.7	0.0	18.9	0.0	8.4
Physical abuse	6.6	49.0	0.0	25.9	0.0	39.9
Total Women (n)	**211**	**196**	**626**	**286**	**394**	**261**
Country mean score (unweighted) (SD)	1.8 (1.8)		0.54 (1.0)		0.65 (1.0)	
% above country mean ("high")	48.2		31.4		39.9	
Exams & Procedures Index (3 items)	**(n=350)**		**(n=797)**		**(n=391)**	
Informed consent	65.0	100.0	0.0	97.6	0.0	56.7
Exposed	60.3	100.0	0.0	9.0	0.0	43.3
Confidential information	14.0	100.0	0.0	5.6	0.0	14.6
Total Women (n)	**214**	**136**	**205**	**592**	**394**	**261**
Country mean score (unweighted) (SD)	2.0 (0.97)		0.83 (0.60)		0.89 (0.78)	
% above country mean ("high")	38.9		74.3		66.8	
Unsupportive Birth Environment Index (11 items)						
Pain relief	88.6	98.8	75.8	98.8	80.6	96.8
No interpreter	0.0	1.8	0.6	2.2	0.0	0.7
No staff present at birth	4.6	11.8	0.6	3.4	1.6	16.9
Neglect	0.0	3.5	0.0	0.5	0.0	1.8
Bribe	0.8	7.1	0.0	1.5	1.1	13.6
Clean up blood/fluids	0.4	2.9	--	--	0.0	0.4
Fluids	11.0	87.7	11.7	82.9	13.8	53.8
Mobilize	89.5	99.4	57.9	98.0	5.9	36.9
No curtains/partitions	82.7	96.5	4.4	28.4	48.1	84.2
No bed	0.4	2.4	0.8	1.0	0.5	10.0

	Nigeria (N=407)		Ghana (N=912)		Guinea (N=655)	
Mistreatment Item	**Low Score**	**High Score**	**Low Score**	**High Score**	**Low Score**	**High Score**
Shared bed	0.0	0.6	0.0	2.7	10.6	36.9
Total Women (n)	**237**	**170**	**503**	**409**	**376**	**279**
Country mean score (unweighted) (SD)	3.3 (0.78)		2.3 (1.0)		2.4 (1.1)	
% above country mean ("high")	41.8		44.9		42.6	

Table 4.16. Spearman-Rank Correlations Between Mistreatment Measures by Country

Measurement	Interpersonal Abuse Scale	Exams & Procedures Index	Unsupportive Birth Environment Index
		Nigeria (N=407)	
Interpersonal Abuse Scale	1.00		
Exams & Procedures Index	0.19	1.00	
Unsupportive Birth Environment Index	-0.07	-0.07	1.00
		Ghana (N=912)	
Interpersonal Abuse Scale	1.00		
Exams & Procedures Index	0.13	1.00	
Unsupportive Birth Environment Index	0.03	0.14	1.00
		Guinea (N=655)	
Interpersonal Abuse Scale	1.00		
Exams & Procedures Index	0.06	1.00	
Unsupportive Birth Environment Index	0.02	-0.07	1.00

4.4 AIM 2 RESULTS

4.4.1 Distribution of Mistreatment Scores by Individual, Provider, and Delivery Characteristics

Table 4.17 shows the percentage and number of women with high scores on the Interpersonal Abuse Scale by the individual-, provider-, and delivery-related factors included in the multivariate risk factors analysis stratified for each country. In Nigeria, there were significant differences by age; a higher proportion of younger women aged 15-19 years and a lower proportion of women aged 30 and older had high scores above the country-specific mean. The proportion with high scores was lower among women who had a Cesarean delivery. There were no differences in Interpersonal Abuse scores by education level, marital status, number of previous births, primary labor attendant or staff member present at delivery, birth companion presence, or time/day of delivery.

Similar differences in Interpersonal Abuse Scale score by age were observed in Ghana, with women aged 30 years and older less commonly scoring high. There were also significant differences by time of delivery in Ghana, with a greater proportion of women with high scores delivering during the day.

Several significant differences were observed in Guinea. Differences in Interpersonal Abuse score by age mirrored those in Nigeria and Ghana. The percentage with high scale scores was greater among unmarried women and women who did not have a previous birth, had a trainee as a primary labor companion, and had a vaginal delivery.

The results of a similar analysis for the Exams and Procedures Index are shown in **Table 4.18.** In Nigeria, a greater percentage of unmarried women and women with nurse/midwives as a primary labor attendant had high index scores above the country-specific mean. In Ghana, a

higher percentage of women with vaginal deliveries, those with a companion present, and those with daytime deliveries had high index scores. Index scores differed by education level in Guinea, with a higher percentage of women with a secondary education having high index scores. Women in Guinea with high index scores also more commonly had a nurse/midwife as both the primary labor attendant and as the staff member present during delivery, had a vaginal delivery, and had a companion present.

A similar assessment for the Unsupportive Birth Index is displayed in **Table 4.19**, although few significant differences were noted for the various risk factors. Differences in Nigeria were only observed when a staff member was present at delivery, where women with a nurse/midwife present at delivery tended to have high index scores. In Ghana, only differences in time of delivery were observed, where a significantly higher percentage of women with daytime deliveries had high index scores. In Guinea, a higher percentage of women aged 20-29 and 30 years and older had high index scores, as did women with 2 or more previous births.

Table 4.17. Individual, Provider, and delivery characteristics of women with high Interpersonal Abuse scores by country

Country	**Nigeria**		**Ghana**		**Guinea**	
Sample Size	**407**		**912**		**655**	
	High Scores		**High Scores**		**High Scores**	
	%	*N*	*%*	*N*	*%*	*N*
Individual Characteristics						
Age (years)						
15-19	**73.3**	**11**	**39.5**	**30**	**50.9**	**89**
20-29	**52.2**	**95**	**35.2**	**158**	**39.4**	**140**
30+	**42.9**	**90**	**25.3**	**387**	**25.6**	**32**
Education Level						
None/ Primary	36.4	8	30.7	90	40.4	177
Secondary	46.0	81	32.5	150	40.1	61
Post-secondary or higher	51.5	105	30.0	40	34.9	15
Marital status						
Married	47.8	184	31.3	230	**38.4**	**235**
Not married	57.1	12	31.6	56	**60.5**	**26**
Number of previous births						
0	52.8	86	34.4	118	**48.9**	**115**
1	51.8	57	33.3	83	**40.6**	**58**

2+	39.6	53	26.6	85	**31.8**	**88**
Provider Characteristics						
Primary labor attendant [a]						
Nurse/Midwife	48.6	167	31.7	241	**40.4**	**185**
Doctor	36.8	7	26.7	27	**22.3**	**23**
Trainee	68.2	15	43.2	16	**56.0**	**42**
Staff member present at delivery [b]						
Nurse/midwife	48.4	148	32.1	214	**44.0**	**182**
Doctor	51.5	34	27.8	60	**30.1**	**47**
Delivery Characteristics						
Mode of delivery						
Vaginal	**49.5**	**188**	32.4	248	**43.0**	**242**
Cesarean	**29.6**	**8**	25.9	38	**20.7**	**19**
Companion was present during labor and/or delivery	48.7	38	31.4	32	40.9	27
Time of delivery [c]						
Day	49.8	100	**35.6**	**139**	38.2	107
Night	46.6	96	**28.2**	**147**	41.1	154
Day of delivery						
Weekday	46.6	144	31.5	212	38.2	196
Weekend	53.1	52	31.0	74	45.8	65

Table 4.17

Note: Estimates reported in table reflect proportion of women with "high" scores, assessed as those **above the country-specific mean level** compared to those with low" scores, assessed as those **at or below the country-specific mean**. **Bold** estimates indicate a significant ($p \leq 0.05$) difference between groups based on X^2 test for differences. Proportions reflect row frequencies. [a]Trainee= medical students, nursing students, midwifery students [b]Among women with a staff member present at delivery [c] "Day"= 8:00-17:00 (5:00pm); "Night"=17:01 (5:01pm)-7:59

Table 4.18. Individual, Provider, and Delivery Characteristics of Women with High Exams & Procedures Index Scores by Country

Country	**Nigeria**		**Ghana**		**Guinea**	
Sample Size	**350**		**797**		**391**	
	High Scores		**High Scores**		**High Scores**	
	%	*N*	*%*	*N*	*%*	*N*
Individual Characteristics						
Age (years)						
15-19	50.0	7	82.5	52	71.3	72
20-29	32.9	52	74.2	293	64.8	138
30+	43.3	77	72.9	247	66.2	51
Education Level						
None/ Primary	31.6	6	74.9	194	**61.6**	**154**
Secondary	39.5	58	74.9	298	**78.4**	**80**
Post-secondary or higher	40.0	72	73.8	90	**68.6**	**16**
Marital status						
Married	37.8	125	74.7	486	66.1	244
Not married	57.9	11	72.6	106	77.3	17
Number of previous births						

0	33.8	50	78.3	249	69.6	86
1	39.1	36	73.9	156	66.7	58
2+	45.5	50	69.8	187	64.5	107
Provider Characteristics						
Primary labor attendant [a]						
Nurse/Midwife	**39.9**	**118**	76.1	502	**77.9**	**190**
Doctor	**33.3**	**6**	65.0	65	**41.7**	**40**
Trainee	**5.9**	**1**	70.8	17	**68.4**	**26**
Staff member present at delivery [b]						
Nurse/midwife	38.6	100	75.2	424	**72.0**	**154**
Doctor	35.5	22	71.1	150	**56.1**	**74**
Delivery Characteristics						
Mode of delivery						
Vaginal	39.6	128	**75.9**	**493**	**75.3**	**225**
Cesarean	29.6	8	**67.4**	**99**	**39.1**	**36**
Companion was present during labor and/or delivery	38.6	27	**85.0**	**79**	**81.0**	**47**
Time of deliveryc[c]						
Day	40.0	70	**82.5**	**279**	66.3	114
Night	37.7	66	**68.2**	**313**	67.1	147
Day of delivery						
Weekday	36.6	98	74.1	433	66.5	208
Weekend	46.3	38	74.7	159	68.0	53

Table 4.18

Note: Estimates reported in table reflect proportion of women with "high" scores, assessed as those **above the country-specific mean level** compared to those with low" scores, assessed as those **at or below the country-specific mean**. **Bold** estimates indicate a significant ($p \leq 0.05$) difference between groups based on X^2 test for differences. Proportions reflect row frequencies. [a] Trainee= medical students, nursing students, midwifery students [b] Among women with a staff member present at delivery [c] "Day"= 8:00-17:00 (5:00pm); "Night"=17:01 (5:01pm)-7:59

Table 4.19. Individual, Provider, and Delivery Characteristics of Women with High Unsupportive Birth Environment Index Scores by Country

Country	**Nigeria**		**Ghana**		**Guinea**	
Sample Size	**407**		**912**		**655**	
	High Scores		**High Scores**		**High Scores**	
	%	*N*	*%*	*N*	*%*	*N*
Individual Characteristics						
Age (years)						
15-19	26.7	4	46.1	35	**33.7**	**59**
20-29	39.6	72	44.5	200	**44.8**	**159**
30+	44.8	94	445.0	174	**48.8**	**61**
Education Level						
None/ Primary	40.9	9	46.4	136	42.9	188
Secondary	42.1	74	42.9	198	39.5	60
Post-secondary or higher	41.2	84	45.5	61	53.5	23
Marital status						
Married	42.5	164	45.4	334	43.0	263

Not married	28.6	6	42.4	75	37.2	16
Number of previous births						
0	35.6	58	46.9	161	**34.0**	**80**
1	41.8	46	46.2	115	**46.9**	**67**
2+	49.3	66	41.6	133	**47.7**	**132**
Provider Characteristics						
Primary labor attendant [a]						
Nurse/Midwife	42.4	146	46.0	350	42.8	196
Doctor	47.4	9	35.6	36	38.8	40
Trainee	36.4	8	40.5	15	44.0	33
Staff member present at delivery [b]						
Nurse/midwife	**42.5**	**130**	44.8	299	36.7	152
Doctor	**25.8**	**17**	42.6	92	39.7	62
Delivery Characteristics						
Mode of delivery						
Vaginal	42.4	161	44.8	343	43.3	244
Cesarean	33.3	9	44.9	66	38.0	35
Companion was present during labor and/or delivery	47.4	37	45.1	46	42.4	28
Time of delivery [c]						
Day	41.8	84	**49.2**	**192**	39.6	108
Night	41.8	86	**41.6**	**217**	45.6	171
Day of delivery						
Weekday	40.1	124	46.4	312	44.4	228
Weekend	46.9	46	40.6	97	35.9	51

Table 4.19
Note: Estimates reported in table reflect proportion of women with "high" scores, assessed as those **above the country-specific mean level** compared to those with "low" scores, assessed as those **at or below the country-specific mean**. **Bold** estimates indicate a significant ($p \leq 0.05$) difference between groups based on Chi-2 test for differences. Proportions reflect row frequencies. [a] Trainee= medical students, nursing students, midwifery students [b] Among women with a staff member present at delivery [c] "Day"= 8:00-17:00 (5:00pm); "Night"=17:01 (5:01pm)-7:59

4.4.2 Multivariable Risk Factors Results

Table 4.20 presents the adjusted odds ratios of higher levels of mistreatment for individual, provider, and delivery characteristics by mistreatment measure and country. Findings from the multivariate fixed effects models (accounting for clustering in facilities) varied across countries.

Interpersonal Abuse

In the multivariate analysis, the only individual characteristic that was related to interpersonal abuse was age in Ghana; women aged 30 years and older had about a 40% lower odds of high interpersonal abuse scores (aOR: 0.64, 95% CI: 0.45-0.90) than younger women. Related to provider characteristics, women in Nigeria who had a doctor present at the time of delivery had twice the odds of high interpersonal abuse (Interpersonal Abuse Scale scores above the country-specific mean) (aOR: 2.03, 95% CI: 1.01-4.11) than those who had a nurse/midwife present. Ghanaian women who had a trainee as their primary labor attendant had more than twice the odds of high interpersonal abuse than those who had a nurse/midwife (aOR: 2.14, 95% CI: 1.01-4.54) as did women in Guinea; women attended by a trainee also had more than twice the odds of high interpersonal abuse than women primarily attended to by a nurse/midwife (aOR: 2.22, 95% CI: 1.19-4.14). Nighttime delivery in Ghana was the only delivery characteristic related to interpersonal abuse, which was associated with lower odds of high interpersonal abuse (aOR: 0.73, 95% CI: 0.54-0.90).

Exams & Procedures

In Guinea, having no education or primary education was associated with more than 50% lower odds of higher levels of inappropriate conduct of exams & procedures (aOR: 0.46, 95% CI: 0.22-0.98) compared to those with a secondary education. Similarly, women in Ghana with two or more previous births also had lower odds of high scores in the Exams & Procedures Index (aOR: 0.49, 95% CI: 0.30-0.80). No provider characteristics were related to higher levels of inappropriate conduct of exams & procedures in these settings, though a few associations were seen by delivery characteristics. Women who had a companion present was associated with more than twice the odds of high scores in both Ghana and Guinea (aOR: 2.26, 95% CI: 1.19-4.30 and

aOR: 2.82, 95% CI: 1.13-7.01, respectively). Women in Ghana who delivered at night had lower odds of high scores (aOR: 0.45, 95% CI: 0.31-0.65). No individual, provider or delivery factors were associated with higher inappropriate conduct of exams & procedures in Nigeria.

Unsupportive Birth Environment

Having two or more previous births was associated with increased odds of higher unsupportive birth environment scores in Nigeria (aOR: 2.07, 95% CI: 1.09-3.93), as was having post-secondary education or higher in Guinea (aOR: 2.37, 95% CI: 1.08-5.20). No individual characteristics were related to a more unsupportive birth environment in Ghana. Related to providers, having a doctor present at delivery in Nigeria was associated with lower odds than for women who had a nurse/midwife present (aOR: 0.28, 95% CI: 0.12-0.68); no provider-related factors were associated higher unsupportive birth environments in Ghana or Guinea. Time of delivery was associated with higher levels of an unsupportive birth environment in Ghana, where women with a nighttime delivery had 30% lower odds of having high index scores compared to those delivering during the day (aOR: 0.70, 95% CI: 0.53-0.93); in contrast, women with a nighttime delivery in Guinea had about 50% higher odds of a more unsupportive birth environment (aOR: 1.48, 95% CI: 1.01-2.18).

Table 4.20 Adjusted Odds Ratios of Individual, Provider, and Delivery Factors Associated with Mistreatment by Country and Mistreatment Measure

	Nigeria (N=407)			Ghana (N=912)			Guinea (N=655)		
	aOR (95% CI)			*aOR (95% CI)*			*aOR (95% CI)*		
	Interpersonal Abuse	*Exams & Procedures*	*Unsupportive Birth Environment*	*Interpersonal Abuse*	*Exams & Procedures*	*Unsupportive Birth Environment*	*Interpersonal Abuse*	*Exams & Procedures*	*Unsupportive Birth Environment*
Individual Characteristics									
Age *(ref: 20-29 years)*									
15-19 years	3.57 (0.77-16.4)	1.79 (0.41-7.90)	1.08 (0.25-4.65)	1.21 (0.68-2.17)	1.35 (0.62-2.94)	1.17 (0.67-2.05)	1.54 (0.90-2.61)	0.95 (0.36-2.47)	0.86 (0.49-1.51)
30+ years	0.78 (0.48-1.28)	1.69 (0.95-3.00)	0.90 (0.53-1.52)	**0.64** (0.45-0.90)**	1.08 (0.73-1.62)	1.24 (0.90-1.71)	0.65 (0.37-1.14)	2.08 (0.85-5.11)	1.26 (0.74-2.17)
Education Level [a] *(ref: Secondary)*									
None/ Primary	0.85 (0.31-2.33)	0.50 (0.16-1.55)	1.22 (0.43-3.44)	0.90 (0.64-1.27)	1.00 (0.69-1.50)	1.17 (0.85-1.60)	1.28 (0.63-2.94)	**0.46* (0.22-0.98)**	1.19 (0.75-1.89)
Post-secondary or higher	1.10 (0.70-1.74)	1.13 (0.66-1.92)	0.94 (0.57-1.53)	0.83 (0.53-1.31)	0.76 (0.45-1.28)	0.96 (0.63-1.45)	1.07 (0.49-2.33)	0.46 (0.12-1.78)	**2.37* (1.08-5.20)**
Marital status *(ref: Married)*									
Not married	0.78 (0.25-2.47)	2.44 (0.70-8.50)	0.67 (0.19-2.33)	0.82 (0.53-1.28)	0.79 (0.47-1.32)	0.89 (0.59-1.34)	1.36 (0.83-2.94)	0.69 (0.18-2.71)	0.98 (0.43-2.20)
Number of previous births *(ref: 0)*									
1	1.06 (0.62-1.84)	1.32 (0.70-2.49)	1.20 (0.66-2.18)	0.96 (0.64-1.43)	0.74 (0.45-1.21)	0.85 (0.58-1.24)	0.79 (0.45-1.37)	0.45 (0.17-1.21)	1.56 (0.88-2.75)
2+	0.77 (0.43-1.40)	1.42 (0.72-2.80)	**2.07* (1.09-3.93)**	0.80 (0.52-1.23)	**0.49** (0.30-0.80)**	0.71 (0.48-1.05)	0.67 (0.37-1.22)	0.40 (0.13-1.19)	1.47 (0.79-2.73)
Provider Characteristics									
Primary labor attendant[b] *(ref:Nurse/Midwife)*									
Doctor	0.61 (0.16-2.32)	1.61 (0.35-7.38)	3.80 (0.82-17.6)	1.07 (0.56-2.05)	0.65 (0.33-1.27)	0.58 (0.32-1.06)	0.64 (0.19-2.19)	0.98 (0.13-7.33)	0.83 (0.25-2.72)
Trainee [c]	2.03 (0.72-5.73)	0.13 (0.02-1.09)	1.44 (0.51-4.07)	**2.14* (1.01-4.54)**	1.01 (0.25-2.98)	1.10 (0.52-2.30)	**2.22** (1.19-4.14)**	0.52 (0.19-1.39)	0.90 (0.47-1.75)

Staff member present at delivery [de] *(ref:Nurse/Midwife)*									
Doctor	**2.03* (1.01-4.11)**	0.92 (0.43-1.97)	**0.28** (0.12-0.68)**	0.81 (0.48-1.37)	0.88 (0.47-1.64)	0.92 (0.56-1.50)	0.72 (0.41-1.26)	0.96 (0.33-2.77)	1.45 (0.83-2.55)
Delivery Characteristics									
Mode of delivery *(ref: Vaginal)*									
Cesarean	0.47 (0.12-1.81)	0.66 (0.14-3.16)	1.19 (0.24-5.93)	0.85 (0.44-1.61)	0.87 (0.42-1.76)	1.24 (0.69-2.26)	0.77 (0.22-2.68)	0.30 (0.04-2.23)	0.95 (0.29-3.13)
Companion present during labor and/or delivery *(ref: Not present)*	0.93 (0.53-1.64)	1.10 (0.57-2.10)	1.30 (0.71-2.38)	1.08 (0.66-1.77)	**2.26** (1.19-4.30)**	1.12 (0.71-1.77)	1.04 (0.55-1.95)	**2.82* (1.13-7.01)**	0.93 (0.45-1.53)
Time of delivery *(ref: Day)*									
Night [f]	0.88 (0.57-1.35)	0.97 (0.59-1.59)	0.97 (0.61-1.53)	**0.73* (0.54-0.98)**	**0.45*** (0.31-0.65)**	**0.70** (0.53-0.93)**	1.16 (0.80-1.69)	0.97 (0.52-1.81)	**1.48* (1.01-2.18)**
Day of delivery *(ref: Weekday)*									
Weekend	1.42 (0.85-2.38)	1.33 (0.74-2.39)	1.11 (0.64-1.91)	1.00 (0.71-1.40)	1.14 (0.76-1.70)	0.79 (0.57-1.08)	1.32 (0.85-2.04)	1.35 (0.63-2.92)	0.69 (0.43-1.09)

Table 4.20

Note: Adjusted odds ratios show the odds of mistreatment scores **above the country-specific mean level** compared to those **at or below the country-specific mean**. Estimates are derived from multivariate fixed effects logistic regression models that adjust for clustering within facilities. [a] n=402 (Nigeria), n=889. (Ghana), n=633 (Guinea). [b] n=385 (Nigeria), n=899 (Ghana), n=636 (Guinea). [c] Trainee= medical students, nursing students, midwifery students. [d] n=372 (Nigeria), n=883 (Ghana), n=570 (Guinea). [e] Among those that had a staff member present at delivery. [f] "Day"= 8:00-17:00 (5:00pm); "Night"=17:01 (5:01pm)-7:59. * p≤0.05, ** p≤0.01, *** p≤0.001

4.5 SUMMARY OF MAIN FINDINGS

Three multidimensional mistreatment measures were developed in Nigeria, Ghana, and Guinea: a 7-item Interpersonal Abuse Scale, a 3-item Exams & Procedures Index, and an 11-item Unsupportive Birth Environment Index. The analysis of the measures indicated that Nigeria women had the highest scores, approximately one point or more, across the three countries on all three measures. While country-specific means and ranges of scores varied considerably, many women scored higher than their country-specific average on these measures, indicating multiple, overlapping forms of mistreatment were observed in each of these dimensions.

Psychometric analyses indicated a unidimensional Interpersonal Abuse Scale in all three countries, providing evidence for good structural and cross-cultural construct validity of the scale. Construct validation via hypothesis testing yielded mixed results for this scale across countries. Higher scale scores were positively associated with women's reports of dissatisfaction with their overall care experience in Ghana and Guinea, indicating construct validity of the scale, though no association was observed in Nigeria. Nighttime delivery was negatively associated with higher scale scores in Ghana, counter to the hypothesized direction, and no association was observed in either Nigeria or Guinea. The hypothesis that women's reports of any postpartum depression would be positively associated with higher interpersonal abuse scores also showed mixed evidence supporting the scale's construct validity, with higher odds of postpartum depression found in Guinea, but lower odds with increasing scores in Nigeria and null results in Ghana. Multiple tests of internal reliability indicated adequate internal consistency among scale items and scores in all three countries, though only the sample in Nigeria reached the KR-20 coefficient benchmark of 0.71 for adequate scale reliability.

The Exams & Procedures Index also had inconsistent evidence of construct validity across settings. The positive association between higher index scores and having a nurse/midwife as the primary birth attendant in Nigeria and Guinea, higher odds of postpartum depression in Nigeria, and positive correlations with facility birth volume in Ghana and Guinea all provide evidence of good construct validity, though these associations were not consistently seen across countries. On the other hand, negative associations between higher index scores and nighttime delivery and having a birth companion present in Ghana run counter to the hypothesized direction, which does not support strong construct validity of the index. Tests of internal consistency for reliability showed good internal consistency of both the items in the index and index scores; the proportion of an observed item was higher among women with "high" scores than for women with "low scores" for every item in all measures across settings, indicating the scores consistently distinguished between "high" and "low" levels of mistreatment.

Evidence for construct validity was limited for the Unsupportive Birth Environment Index. Positive associations between higher index scores and postpartum depression in Guinea provides some evidence of construct validity in that setting, though null results were seen in Nigeria and Ghana for this relationship. Contrary to the hypothesized direction, higher index scores were negatively associated with nighttime deliveries in Ghana. However, the index showed adequate internal consistency of both items and scores, though several items did not vary by level of mistreatment due to low frequency.

Results from the risk factors analysis were mixed. Women in Nigeria who had a doctor present at delivery had significantly higher interpersonal abuse, as did women with trainees as primary attendants throughout labor in both Ghana and Guinea; older women aged 30 years and older and women who delivered at night were less likely to have high interpersonal abuse in

Ghana. Having a companion present was associated with higher mistreatment during exams & procedures in Ghana and Guinea, while women in Ghana who had two previous births or delivered at night and women in Guinea with none or primary education all had lower odds of high scores in this dimension; no relationship was observed in Nigeria. In Nigeria, women with two or more previous births had significantly higher than average scores on the Unsupportive Birth Environment Index, as did women in Guinea with a post-secondary or higher education and who delivered at night; conversely, women in Nigeria who had a doctor present at delivery and women who delivered at night in Ghana and had lower odds of more unsupportive birth environments.

4.6 REFERENCES

1. DeVellis, R.F., *Scale development: Theory and applications*. Vol. 26. 2016: Sage publications.
2. Netemeyer, R.G., W.O. Bearden, and S. Sharma, *Scaling procedures: Issues and applications*. 2003: Sage Publications.
3. Clark, L.A. and D. Watson, *Constructing validity: Basic issues in objective scale development.* Psychological assessment, 1995. **7**(3): p. 309.

CHAPTER 5: DISCUSSION AND IMPLICATIONS FOR PUBLIC HEALTH RESEARCH, PROGRAMS, AND PRACTICE

5.1 CHAPTER OVERVIEW

This chapter discusses the main findings of the two aims of this research. It begins with a brief overview of the study aims and methods. A discussion of the main findings for each aim is presented, followed by the strengths and limitations of the study. The chapter concludes with the implications of this work for public health programming, practice, and future research.

5.2 STUDY OVERVIEW

5.2.1 Study Aims

The aims of this study were to:

Aim 1: Develop a set of valid and reliable measures for mistreatment of women during facility-based childbirth, including the following dimensions: interpersonal abuse, inappropriate conduct of exams & procedures, and unsupportive birth environment, using samples of women in Nigeria, Ghana, and Guinea.

Aim 2: Identify individual-, provider-, and delivery-related factors associated with mistreatment during facility-based childbirth in Nigeria, Ghana, and Guinea using the measures developed and confirmed in Aim 1.

5.2.2 Study Methods

The data source for this study was a labor observation tool measuring mistreatment from the multi-phase WHO Multi-Country Study on How Women are Treated During Childbirth, wherein observations were conducted between 2016-2018 in Nigeria, Ghana, and Guinea. The labor observation tool contained a pool of 56 items based on an evidence-based WHO typology for mistreatment covering the following domains: physical abuse, verbal abuse, failure to meet professional standards of care, poor rapport/communication between patients and providers, and health systems conditions and constraints. Face and content validity were established during the qualitative phase of the WHO study, consensus building and review by multiple expert panels, and cognitive interviewing. The analytic study sample included 1,974 women (407 in Nigeria,

912 in Ghana, and 655 in Guinea) admitted to one of three study facilities in each country who were continuously observed from time of admission to two hours postpartum.

In Aim 1, a set of 3 measures for mistreatment were developed covering 3 dimensions: a 7-item Interpersonal Abuse Scale, a 3-item Exams & Procedures Index, and an 11-item Unsupportive Birth Environment Index. Exploratory factor analysis was used to construct the Interpersonal Abuse Scale and assess its structural and cross-cultural construct validity and internal reliability. The Exams & Procedures and Unsupportive Birth Environment Indexes were developed through an adapted OECD approach for composite index development. All three measures were scored as simple summative measures. Measure performance, construct validity via hypothesis testing, and internal consistency analyses for reliability were conducted on the three mistreatment measures.

Aim 2 examined individual, provider, and delivery factors associated with mistreatment in Nigeria, Ghana, and Guinea using the three mistreatment measures developed in Aim 1. Multivariate logistic regression models with fixed effects estimated the odds of mistreatment separately by measure and country. The main outcome was assessed as having mistreatment scores "higher than average;" that is, higher than the country-specific mean score compared to those with scores at or below the country mean. Individual-level covariates included the woman's age, education level, marital status, and number of previous births. Provider-level covariates were primary labor attendant and staff member present at time of delivery. Delivery covariates included presence of a birth companion, mode of delivery, day of week of delivery, and time of delivery.

5.3 AIM 1 DISCUSSION

In Aim 1, a multidimensional set of condensed, yet comprehensive measures assessing mistreatment of women during childbirth was developed and validated: the Interpersonal Abuse Scale, the Exams & Procedures Index, and the Unsupportive Birth Environment Index. From these measures, we see in all three settings that while country-specific mean scores varied considerably in the possible range of scores, many women scored above 0 and 1 on these measures, and high proportions of women scored above their country-specific average. This finding indicates multiple, overlapping forms of mistreatment were observed within these dimensions. In general, Nigeria had the highest frequency on all items, and women in this sample scored highest on all three measures, approximately one point or more than women in either Ghana or Guinea.

The set of three measures developed in this study, rather than a single lengthy composite measure, underscores the complex and multidimensional nature of mistreatment as a construct that does not have one single common underlying cause. As we acknowledged in Chapter 2, mistreatment captures a broad range of behaviors and experiences, some of which may reflect more intentional forms of violence and abuse, while others reflect poor quality care. The latter may be due to health system deficiencies like lack of resources or personnel or facility policies; they also may reflect norms in training around pragmatic strategies to establish professional distance or maintain control and compliance during delivery in an effort to ensure expedient and/or good birth outcomes [1-7].

An advantage of the separate measures assessing different mistreatment dimensions is the ability to quantiatively distinguish between particular areas with higher and lower levels of mistreatment, as well as determine tailored quality improvement responses or interventions

targeting the dimensions with the highest mistreatment scores. For example, high Interpersonal Abuse Scale or Exams & Procedures Index scores may be addressed through routine audit/feedback loops and training interventions, whereas changes to elements of the Unsupportive Birth Index could be made through a healthy systems response targeting resources. In all three study settings, higher levels of mistreatment were observed in some dimensions while lower levels were observed in others. This finding echoes results of previous research, both quantitative and qualitative, noting where within the same birth experience, women might receive high quality, respectful care in some aspects of their care and mistreatment or lower quality care in others [8-11].

All measures were scored as unweighted simple summative scores based on binary items of whether an item was observed or not, such that all items equally contributed to the score of a measure. This scoring construction was selected for multiple reasons. Although items in the Interpersonal Abuse Scale were potentially based on multiple incident reports, frequency was not taken into account in the scale by reconfiguring the items as ordinal variables. This approach has been used in existing scales in other fields measuring violence and abuse (e.g., for the item "Was the woman slapped?", response patterns would be configured to reflect the number of incident reports recorded in the labor observation tool as "0- No, 1- Once, 2- Twice, and 3- Three or more times") [12, 13]. It was determined that configuring interpersonal abuse items ordinally would embed a severity gradient in the scale scores that might be conceptually and clinically artificial or inconsistent; for example, a woman who was shouted/screamed at three times would receive a score of 3 on this item, whereas a woman who was punched once would receive a score of 1.

Second, it was determined that assigning weights to items in any of the three measures would not be appropriate. Computationally, deriving weights from principal components analysis

(PCA), a typical method of weighting, poses significant challenges in a study aiming to develop measures from a multi-country sample that can be applied in a range of settings. Weights derived from PCA are based on a particular dataset, which renders the measures noncomparable across country samples [14, 15]. From a theoretical perspective, deriving weights was also deemed inappropriate for a construct like mistreatment. Although the particular measures are based on observations, this weighting would conceptually remove women's experiences from the center focus of mistreatment because it would involve the external measurer placing a valence on which mistreatment items are "worse" than others. These valences likely are not consistent across settings (either within or between countries) as societal norms inform what is viewed as abusive. They also may not align with women's individual experiences and perceptions of which forms of mistreatment are most impactful to them [8]. In some settings, forms of physical and verbal abuse in facilities may be normalized, but women may view breaches in privacy like not having curtains or having to share a bed with another woman as particularly egregious; the opposite may be true in another setting.

Our scoring configuration using equal weighting is not without limitations. It does not account for the potentially compounding impact of repeat instances of a specific type of mistreatment, nor does it weight mistreatment items higher that may have more impact on clinical maternal and newborn health outcomes. As this field more firmly establishes some of the clinical impacts of mistreatment, this issue may need to be revisited in future research as these tools are further refined and validated in other settings.

5.3.1 Interpersonal Abuse Scale

Results of the psychometric analyses in this study support a 7-item unidimensional Interpersonal Abuse Scale based on strong factor loadings of all 7 items on a single factor in all

three country samples. Women in these settings had a wide range of scale scores. Between approximately 30-50% of women scored higher than their country-specific means, indicating multiple, overlapping forms of interpersonal abuse were frequently observed in the study facilities. Particularly common forms were being shouted/screamed at, being scolded, and experiencing at least one form of physical abuse.

It is difficult to directly compare the estimates from our study to those found in previous studies due to significant variation across previous studies in sampling, modes of reporting, and measurement tools, including what is captured in "verbal abuse" and "physical abuse" indicators. Further complicating these comparisons is that our scale captures specific forms of verbal abuse rather than a single "verbal abuse" composite. However, our estimates of verbal abuse (ranging from 2-53% across countries and forms of abuse) are higher than those from other sub-Saharan African settings that ranged from 8-16% in Kenya, Ethiopia, and Ghana [16-18]. Our estimates of physical abuse (ranging from 8% in Ghana to 16% in Guinea to 27% in Nigeria) also are markedly higher than the frequency of physical abuse Kruk et al. documented in Tanzania (5%) and those Afulani et al. found in Ghana, Kenya, and India using a person-centered maternity care scale (frequencies ranging from 4% in Ghana to 5% in Kenya to 3% in India) [17]. Our estimates are in line with those found in previous work conducted in Ethiopia, Kenya, and Nigeria that ranged from 9-37% [16, 18-20].

A primary goal of this scale was to be able to assess specific forms of verbal and physical abuse, rather than relying on broad categories about whether a woman experienced "any" abuse. While we were able to measures multiple discrete forms of verbal abuse in the scale, the low frequency of the majority of physical abuse items required that we collapse this category into a single item of having experienced at least one form of physical abuse. Broadly, this item

captured two dimensions of physical abuse: being physically struck (pinched, kicked, slapped, punched, or hit with an instrument), and other uses of physical restraint or force (being gagged, physically tied to the bed, held down forcefully to the bed, forceful downward pressure on the abdomen, and other use of force). While the factor structure of this scale with two physical abuse items did not indicate a good fit using the data, future research refining this tool in other settings should continue to assess the dimensions of physical abuse separately. As with the forms of verbal abuse measured in the scale, the impetus behind these forms of physical abuse might differ and may require different approaches to address and prevent them. Findings from previous qualitative research indicate that while some forms of abuse may come from intentional malice, others may be products of norms around clinical training, and could be viewed as strategies to regain control, get women to comply, as well as ensure good birth outcomes [2, 4-7, 11, 21-23]. The extent to which future iterations of this scale can assess this level of granularity will improve its utility to serve in quality improvement efforts and facility audits to identify particular areas for intervention.

5.3.2 Exams & Procedures Index

The majority of women received at least a score of 1 on this index across all three countries, indicating that inappropriate conduct of exams & procedures; unconsented care and communication, as well as breaches in privacy were common. Receiving procedures or vaginal examinations without informed consent was very frequent in the samples, observed in between half to over three quarters of women, consistent or higher than previous studies documenting frequent non-consented care [17, 19, 20]. The higher proportions of women in Nigeria who had vaginal exams conducted such that their genitals were exposed to other patients or non-clinical staff, or who had their private health information discussed so others could hear were stark

compared to those observed in Ghana and Guinea. This finding may indicate different physical layouts, space limitations, and crowding in the study facility wards in this setting or it may suggest differences in routine norms or standards in clinical practice. For example, Sen et al. discuss common practices in low- and middle-income settings such as orienting beds and labor tables in open wards toward nurse stations and entryways to prioritize expediency and efficiency of labor progress monitoring over women's privacy. They note, while this approach constitutes disrespectful care rather than intentional abuse, it is often a routine and normalized strategy to monitor many laboring women, particularly when there are a limited number of providers [1].

5.3.3 Unsupportive Birth Environment Index

Some items in the Unsupportive Birth Environment Index that refer specifically to the birth environment and facility resources (e.g., availability of fluids, curtains/partitions, no bed or sharing a bed) may seem similar to those captured in widely used facility assessments like the Service Provision Assessment (SPA) or the WHO Service Availability and Readiness Assessment (SARA). There are, however, some important differences . The items are included in a measure of mistreatment because they were assessed as woman-centered items rather than facility-centered, or more specifically, how women actually interacted with their birth environment. For example, a facility may technically have clean water available or an adequate number of beds to accommodate their average monthly facility volume, but the fluids and bed items in this index measure whether an individual woman actually had access to and utilized the resources.

Not having easy access to fluids, not being told they could mobilize during labor, and not having curtains/partitions for privacy during labor, delivery or the postpartum period were among the most commonly observed items in this index in all three countries. Bed sharing was

markedly higher in Guinea than the other two settings, where over 20% of women shared a bed with another woman laboring at some point during their facility stay. As discussed above, these items could reflect spatial and resource constraints or normative clinical practices. Possible interventions to address areas in this index could involve more structural alterations to the facility space like installing curtains. They may also include provider training to support women mobilizing during labor and delivery. This approach has been highlighted by the WHO recommendations on intrapartum care for a positive childbirth experience as a potential strategy to shorten labor duration and support vaginal delivery over Cesarean [24]. However, identifying underlying causes and implementing interventions to address some items in this index may be more challenging. Approximately 8% of women in Nigeria and Guinea gave birth without a clinical staff member present, similar to previous studies documenting abandonment or neglect at the time of delivery ranging from 5-25% [18, 19, 25, 26]. As this item has the potential to directly impact clinical outcomes, further research is needed to understand why women are delivering unattended in a health facility.

5.3.3 Validity and Reliability of the Measures

Validity

The three mistreatment measures were developed from an item pool that had undergone extensive preliminary work to establish face and content validity. Exploratory factor analysis of the Interpersonal Abuse Scale suggested high inter-item correlations and consistent factor structure for a unidimensional scale, which provides evidence of structural and cross-cultural validity, two elements of construct validity. Correlations between the three measures were low, which further indicates construct validity of three separate, distinct dimensions of mistreatment.

The inconsistent findings of the construct validation analyses via hypothesis testing indicate that further validation of all three measures is needed. However, caution should be used when interpreting these findings, as it is unclear whether the inconsistent findings are due to the actual validity of the measures, with the criterion against which they were measured or both. Eight variables (related to labor/delivery and facility characteristics, women's reports of satisfaction with care, and postpartum depression) were used in this analysis to test hypothesized relationships based on their association with mistreatment documented in previous studies. As we have noted throughout, there are still relatively few quantitative studies on correlates of mistreatment, and these studies included highly varied definitions and measurement tools, study samples, and modes of data collection; further, the results of studies on correlates and impacts of mistreatment are also varied across settings.

We developed three measures assessing separate mistreatment dimensions, but previous research has not established how mistreatment either consistently or differently impacts these dimensions. For example, we used global measures of satisfaction with care, including future intentions to deliver in the same facility, to be consistent with studies that have used this variable to establish construct validity of composite measures of respectful maternity care [27] and person-centered maternity care [28, 29]. However, the extent to which women's reports of satisfaction with care are consistently related to labor observations of mistreatment via interpersonal abuse, inappropriate conduct of exams and procedures, or an unsupportive birth environment is unclear. That some criteria were associated with our mistreatment measures as hypothesized in some settings and not in others (or associated counter to the hypothesized direction) may be less indicative that the measures have limited validity and may instead underscore that labor/delivery or facility characteristics or the impact of mistreatment on

women's reports of satisfaction or postpartum depression vary by setting. Taken together, our confidence in relying on the eight criteria to help firmly establish construct validity of these measures is limited.

There is currently no gold standard to measure mistreatment, which limited our ability to establish criterion validity. As research in this field evolves and more measures are developed and refined, further validation of our measures can be tested against other mistreatment measures to help determine their criterion validity. Further refinement and expansion of items in the indexes may also be needed to iteratively maintain content validity, as the content variety and scope of items is particularly important for the validity of indexes. Future validation of all three mistreatment measures should include multigroup confirmatory approaches to confirm the direction of the relationship between the items and their constructs. Application of the measures in other, diverse geographic settings will also help determine their construct validity and generalizability.

Reliability

All three mistreatment measures showed adequate internal consistency; all items co-occurred with one or more items in the same measure, and the items consistently distinguished between "high" and "low" mistreatment scores. The Interpersonal Abuse Scale achieved an acceptable range of internal reliability [30] in Nigeria, but was limited in Ghana and Guinea. This finding may be due to the higher frequency of scale items in Nigeria. Alternatively, the small number of scale items may have affected the reliability coefficient value, which has been shown to artificially fluctuate based on the number of items in the scale [30-33]. Because of this limitation, we did not rely solely on the reliability coefficient to establish reliability of the Interpersonal Abuse Scale. Nonetheless, further reliability testing of the scale in other settings is

needed; tests of interrater reliability would be especially poignant to establish reliability of these measures since they are based on labor observation data.

5.4 AIM 2 DISCUSSION

Aim 2 results identified individual, provider, and facility factors associated with the three mistreatment measures. We found the relationship between these factors and mistreatment varied across countries.

We found different mistreatment measures were related to women's age, education, and parity. Interpersonal abuse was associated with age in Ghana, where older women (aged 30 years and older) were less likely to experience high levels of interpersonal abuse than women aged 20-29. Our inability to detect differences for younger women aged 15-19 years is likely due to small samples of adolescents in the three countries, though previous research has found associations between young age and mistreatment [2, 34]. Education was associated with both higher levels of inappropriate conduct of exams & procedures and a more unsupportive birth environment in Guinea, where women with no or primary education were less likely to have high inappropriate conduct of exams & procedures than women with a secondary education, whereas women with a post-secondary education or higher had higher odds of a more unsupportive birth environment.

Findings from previous research are mixed regarding the relationship between education or other proxies of socioeconomic status (SES) and mistreatment. A few studies have found higher mistreatment, taking many forms, among women with lower education or SES [35, 36]. Others have shown no association with education [20, 37], while Kruk et al. found women with higher education reported higher mistreatment [26]. Women with higher levels of education may be more informed on their rights to respectful and quality care and may have more agency to report mistreatment. However, as our study was based on labor observations, explanations for

our findings related to education in Guinea are unclear, particularly since bedsharing was most common in this setting.

Higher parity was associated with a more unsupportive birth environment in Nigeria, and reduced odds of more inappropriate conduct during exams & procedures in Ghana. Previous research has found more common verbal abuse, bribing, and detainment among women with higher parity [16, 38]. In the context of an exam or procedure, it is difficult to conjecture why these relationships are in different directions in the two countries and there is no relation of parity with any measure in Guinea.

At the provider-level, having a trainee as a primary attendant was associated with higher levels of interpersonal abuse, compared to having a nurse/midwife, in both Ghana and Guinea. Qualitative and mixed-method research among providers and trainees has documented that forms of abuse are often witnessed and normalized in training programs. Even when high quality care is taught as the central value, this work has shown that interpersonal aspects of care are often not central to training models of quality care [1, 3, 4]. Instead of a woman-centered model of care, training programs may emphasize norms around expediency and efficiency and systems that reward providers for providing care that achieves these aims[1]. Forms of abuse, particularly right around the time of delivery, can be seen as routine, pragmatic strategies to get women to cooperate, maintain a provider-patient power dynamic where the provider is in control, and facilitate quick deliveries with the aim of ensuring good birth outcomes. Qualitative research among women and providers has documented that both stakeholders provide similar rationale for abuse to ensure good outcomes at the time of delivery [2, 5-7].

Prior research also discusses common “cultures of blame” in health systems that fault providers, particularly those lower on the hierarchical rungs, for negative birth outcomes [1-7,

21, 22]. Thus, our findings of elevated abuse among women with trainees as labor attendants could be partly explained by the confluence of students navigating these care provision systems, a negotiation of power dynamics in their new roles as providers, and blame cultures that focus on expediency, particularly in resource-constrained facilities. Similar provider-patient dynamics around maintaining control and compliance during delivery could underly our finding that higher interpersonal abuse was observed among women who had a physician as the staff member present during delivery in Nigeria. However, the lower odds of a more unsupportive birth environment, tied to the process of care, among women with physicians present at delivery further highlights the multidimensional nature of mistreatment. Together, these findings could indicate that process of care, rather than interpersonal care, may be prioritized during delivery care. We had very limited information on characteristics of the providers (e.g., gender, years of experience), or about the working context of the provider and the facility (e.g., resource and personnel constraints, facility crowding, health system structure, facility capacity and readiness for obstetric emergencies); more information in both of these spheres is critical to provide a more nuanced understanding of the relationship between provider type, interpersonal abuse, and an unsupportive birth environment.

Delivery characteristics in our study included presence of a birth companion and time of delivery. Having a companion present was associated with higher levels of inappropriate conduct during exams & procedures in both Ghana and Guinea. A limitation of this covariate is that we did not capture the relationship of the companion to the woman, nor were we able to assess the "dosage" (if companionship was continuous through labor delivery or if sporadic, occurring either labor or delivery rather than both). It is also possible that this finding may be due to errors in data collection during labor observations in these settings, wherein observers recorded that

women were exposed during exams or providers discussed women's private health information so others could hear just by virtue of her companion being present. Further research is needed to understand the relationship between presence of a companion and different dimensions of mistreatment.

Women who delivered at night had lower odds of mistreatment in all three dimensions in Ghana, whereas nighttime delivery was associated with a more unsupportive birth environment in Guinea. Studies by Abuya et al. in Kenya found nighttime deliveries were associated with more physical and verbal abuse, less rapport building, and fewer physical assessments[16, 38]; the latter two align with our findings related to the unsupportive birth environment in Guinea. The reasons why the results for Ghana run counter to the previous finding are unclear, but could be due to fewer deliveries occurring at night with greater resources available for them, or could be a function of context- or facility-specific practices or policies related to nighttime obstetric care.

5.5 STUDY LIMITATIONS

There are several limitations to consider with this research. A major drawback of the study is the limited ability to assess correlates of mistreatment with facility-level variables. All study facilities were public and located in urban settings, which significantly limits the generalizability of the mistreatment measures, particularly as previous work indicated differences in quality of care and respectful care by urban/rural status and type of facility (including level of care, public/private, and health centre versus hospital) [16, 17, 29, 39-41] . Abuya et al. (2018) recently used labor observation and facility assessment data from *The Heshima Project* to combine technical dimensions of QoC from the WHO QoC framework for maternal and newborn health with domains of mistreatment in from WHO typology to

underscore the importance of health system factors in influencing provider behavior [16] . The mistreatment measures from this study can be used in conjunction with a facility assessment metric, like a SPA or SARA assessment, in future research to gain a better understanding of the relationship between context of the health system or facility—including more detailed information about the types and experience levels of providers, in addition to technical resources available-- and mistreatment dimensions. Further validation of the measures in different types of facilities is also needed.

A few additional limitations of the available data impact the interpretability of the individual, provider, and delivery risk factors analysis conducted in Aim 2. Ethnicity or tribal affiliation and religion were not assessed in either survey; previous work has shown an association between ethnic or religious minority groups and increased risk of mistreatment [20, 25, 38, 41-45]. There were also limited data about provider characteristics; number of years of experience, and age and gender of the primary provider were assessed, all of which have been associated with risk of mistreatment [25, 41, 43, 46].

Finally, there is potential selection bias in the samples that is often a limitation of studies on facility-based maternity care. While we were unable to corroborate this finding in our study, previous work on mistreatment has found disadvantaged women to be at higher risk of mistreatment, but women with the most severe risk factors may not be able to access a facility, and accordingly do not come under observation; this constraint may attenuate the results in Aim 2, as the most at-risk women may be missed [20, 25, 38, 42, 43]. Selection bias is also possible as a result of excluding women who had obstetric emergencies. Women in these stressful situations in facilities with limited resources to address their emergencies may be at particularly high risk for mistreatment [3, 4, 11, 36, 47, 48].

In the recent Lancet Global Health Commission on QoC, Kruk et al. noted the dearth of person-centered data that health systems collect that "matter" to people such as user experience, competent care and confidence in the health system [49]. A potential drawback of using labor observation data to develop the mistreatment measures is that labor observations may not be as accurate in assessing more experiential aspects of mistreatment; that is, those aspects of mistreatment that may be more intrinsically based on perceptions and responses of women to the care they experienced [50]. Our measures may have also retained items that "matter" less to women's personal experience of care and omitted items that may be important to a women's birth experience such as blaming women for a poor outcome, not offering them to have a labor companion, or not asking women their preferred birth position.

Observers were specifically trained to identify mistreatment and poor QoC, so it is possible that mistreatment was over-reported if they were primed to look for it. Using continuous third-party labor observations in facility-based QoC studies poses a potential Hawthorne effect (i.e., that providers may alter their behavior if they know they are being observed). However, previous QoC studies have shown that Hawthorne effects tend to peak early in the observation period, then attenuate as those observed return to their "normal" activities. Further, these studies still reported poor QoC and high levels of mistreatment, which lends evidence to the pervasiveness and acceptability of mistreatment practices [41, 43, 51-53]. Our conservative approach to assessing "don't know" or "not applicable" responses on mistreatment items as "no mistreatment" likely yielded underestimates in our mistreatment measures. The limited number of facilities in each country also posed a methodologic challenge in the fixed effects models in Aim 2 and could have resulted in large design effects and underestimated odds ratios.

5.6 STUDY STRENGTHS

One major strength of this study is the use of data from multiple countries, which adds to the robustness of the validation of these newly developed measures. There is significant debate over whether labor observations or women's reports are the most accurate mode to measure mistreatment, with many researchers calling for the use of both modalities until a gold standard tool has been developed in the field [38, 43, 46, 54]. A particular strength of this study is that the content validation analyses used linked data from both WHO survey instruments, the labor observations and community surveys, that were designed to mirror each other in assessing mistreatment items. Notwithstanding some of the limitations, the use of continuous labor observations as the basis of these measures limits potential recall and social desirability bias that can accompany women's reports of mistreatment.

The measures extend beyond previous quantitative measures that report dichotomies of ever experiencing at least one kind of mistreatment. They were developed from an extensive item pool that is a product of the evidence-based WHO typology of mistreatment, extensive formative research (qualitative work and a mixed-methods systematic review), expert and member-checking, and pilot testing. Further, the items were assessed as specific and discrete instances of mistreatment, which both lends itself well to observation as a data collection mode as is consistent with existing tools measuring violence and abuse [12, 13]. Finally, we used multiple approaches to access the reliability of the measures across the 3 countries.

5.7 CONCLUSIONS: IMPLICATIONS FOR PUBLIC HEALTH RESEARCH, PROGRAMS, AND PRACTICE

The most significant implication of this research is the development of a multidimensional set of 3 condensed, yet comprehensive measures assessing mistreatment of women during childbirth: an Interpersonal Abuse Scale, Exams & Procedures Index, and

Unsupportive Birth Environment Index. Using these measures, we found that multiple and overlapping forms of mistreatment in each of these dimensions were frequently observed among women in Nigeria, Ghana, and Guinea. The most common forms of interpersonal abuse were being shouted/screamed at, scolded, and physical abuse. Analysis of mistreatment in the context of exams & procedures showed non-consented care was high in all three settings, and the most common elements of an unsupportive birth environment included women not being told they could mobilize during labor, not having curtains or partitions during labor, not having easy access to fluids, and not having pain relief. Both the items in the measures and the measure scores were internally consistent, but further validation and reliability testing are needed.

These measures can be adapted and used in future research on mistreatment to quantify the burden, frequency, and overlap in multiple types of mistreatment in a standardized way that can be compared across studies and settings. The concise nature of these measures, as opposed to the full WHO mistreatment instruments, offers an opportunity to incorporate them in longer surveys assessing other aspects of maternal and newborn health and care.

The measures can also be adapted and integrated into monitoring/evaluation and quality improvement initiatives in facility audits and can be paired with more technical quality of care assessments to gain a more comprehensive understanding of both provision and experience of care. This set of measures assessing different dimensions of mistreatment affords facilities and health systems an opportunity to identify areas with higher and lower levels of mistreatment, which can better inform targeted and specific quality improvement responses for different dimensions.

The mistreatment measures can also be used to assess the impact of program and intervention efforts that prevent and respond to mistreatment. The scales capture elements of

interpersonal behavior and abuse as well as health system infrastructure and resource constraints. These multidimensions allow for their use to assess multi-component interventions that aim to impact both interpersonal aspects of care and more systemic, structural aspects of the process of care.

In addition to more refined measurement methods, more research is needed to understand the more structural determinants of mistreatment during childbirth. Sen et al. note that if intervention efforts are to be successful, they need to involve a nuanced understanding of the broader social context of mistreatment in a given setting and multiple stakeholder buy-in. Effective interventions will need to be sustained efforts as they will involve not only strengthening of health systems to improve the context of care for both patients and providers, but also changes in behavior and norms routinized in care provision and training programs (both clinical and social in re-framing what is considered "good" and "poor" care, in addition to what is considered "abuse") [1]. Efforts in research and programming to understand these broader contextual determinants, dovetailed with refining and reaching consensus on an operational definition and validated measurements of mistreatment, will be critical to addressing this issue and promoting high-quality, respectful, and positive birth experiences for women.

5.8 REFERENCES

1. Sen, G., B. Reddy, and A. Iyer, *Beyond measurement: the drivers of disrespect and abuse in obstetric care.* Reprod Health Matters, 2018. **26**(53): p. 6-18.
2. Maya, E.T., et al., *Women's perspectives of mistreatment during childbirth at health facilities in Ghana: findings from a qualitative study.* Reprod Health Matters, 2018. **26**(53): p. 70-87.
3. Moyer, C.A., et al., *Exposure to disrespectful patient care during training: data from midwifery students at 15 midwifery schools in Ghana.* Midwifery, 2016. **41**: p. 39-44.
4. Rominski, S.D., et al., *When the baby remains there for a long time, it is going to die so you have to hit her small for the baby to come out: justification of disrespectful and abusive care during childbirth among midwifery students in Ghana.* Health policy and planning, 2017. **32**(2): p. 215-224.

5. Jewkes, R., N. Abrahams, and Z. Mvo, *Why do nurses abuse patients? Reflections from South African obstetric services.* Social science & medicine, 1998. **47**(11): p. 1781-1795.
6. Kruger, L.M. and C. Schoombee, *The other side of caring: abuse in a South African maternity ward.* Journal of Reproductive and Infant Psychology, 2010. **28**(1): p. 84-101.
7. Bohren, M.A., et al., *"By slapping their laps, the patient will know that you truly care for her": A qualitative study on social norms and acceptability of the mistreatment of women during childbirth in Abuja, Nigeria.* SSM-Population Health, 2016. **2**: p. 640-655.
8. Vogel, J.P., et al., *Promoting respect and preventing mistreatment during childbirth.* BJOG, 2016. **123**(5): p. 671-4.
9. Chattopadhyay, S., A. Mishra, and S. Jacob, *'Safe', yet violent? Women's experiences with obstetric violence during hospital births in rural Northeast India.* Culture health and sexuality, 2017.
10. Tunçalp, Ö., et al., *Quality of care for pregnant women and newborns—the WHO vision.* BJOG: an international journal of obstetrics & gynaecology, 2015. **122**(8): p. 1045-1049.
11. Warren, N., et al., *Nègènègèn: Sweet talk, disrespect, and abuse among rural auxiliary midwives in Mali.* Midwifery, 2015. **31**(11): p. 1073-1080.
12. Straus, M.A., *Measuring intrafamily conflict and violence: The conflict tactics (CT) scales.* Journal of Marriage and the Family, 1979: p. 75-88.
13. Straus, M.A., et al., *The revised conflict tactics scales (CTS2) development and preliminary psychometric data.* Journal of family issues, 1996. **17**(3): p. 283-316.
14. OECD, *Handbook on constructing composite indicators: methodology and user guide*. 2008: OECD publishing.
15. Dettrick, Z., et al., *Measuring Quality of Maternal and Newborn Care in Developing Countries Using Demographic and Health Surveys.* PLoS One, 2016. **11**(6): p. e0157110.
16. Abuya, T., et al., *Measuring mistreatment of women throughout the birthing process: implications for quality of care assessments.* Reprod Health Matters, 2018. **26**(53): p. 48-61.
17. Afulani, P.A., et al., *Person-centred maternity care in low-income and middle-income countries: analysis of data from Kenya, Ghana, and India.* Lancet Glob Health, 2019. **7**(1): p. e96-e109.
18. Sheferaw, E.D., et al., *Respectful maternity care in Ethiopian public health facilities.* Reproductive Health, 2017. **14**(1): p. 60.
19. Bobo, F.T., et al., *Disrespect and abuse during childbirth in Western Ethiopia: Should women continue to tolerate?* PloS one, 2019. **14**(6): p. e0217126.
20. Okafor, I.I., E.O. Ugwu, and S.N. Obi, *Disrespect and abuse during facility-based childbirth in a low-income country.* International Journal of Gynecology & Obstetrics, 2015. **128**(2): p. 110-113.
21. Balde, M.D., et al., *A qualitative study of women's and health providers' attitudes and acceptability of mistreatment during childbirth in health facilities in Guinea.* Reproductive health, 2017. **14**(1): p. 4.
22. Balde, M.D., et al., *Perceptions and experiences of the mistreatment of women during childbirth in health facilities in Guinea: A qualitative study with women and service providers.* Reproductive health, 2017. **14**(1): p. 3.
23. Burrowes, S., et al., *Midwives' and patients' perspectives on disrespect and abuse during labor and delivery care in Ethiopia: a qualitative study.* BMC Pregnancy and Childbirth, 2017. **17**(1): p. 263.

24. World Health Organization, *WHO recommendations: intrapartum care for a positive childbirth experience*. 2018: World Health Organization.
25. Sando, D., et al., *The prevalence of disrespect and abuse during facility-based childbirth in urban Tanzania.* BMC pregnancy and childbirth, 2016. **16**(1): p. 236.
26. Kruk, M.E., et al., *Disrespectful and abusive treatment during facility delivery in Tanzania: a facility and community survey.* Health Policy and Planning, 2014: p. czu079.
27. Sheferaw, E.D., T.Z. Mengesha, and S.B. Wase, *Development of a tool to measure women's perception of respectful maternity care in public health facilities.* BMC pregnancy and childbirth, 2016. **16**(1): p. 67.
28. Afulani, P.A., et al., *Development of a tool to measure person-centered maternity care in developing settings: validation in a rural and urban Kenyan population.* Reprod Health, 2017. **14**(1): p. 118.
29. Afulani, P.A., et al., *Validation of the person-centered maternity care scale in India.* Reprod Health, 2018. **15**(1): p. 147.
30. DeVellis, R.F., *Scale development: Theory and applications*. Vol. 26. 2016: Sage publications.
31. Streiner, D.L., *Being inconsistent about consistency: when coefficient alpha does and doesn't matter.* J Pers Assess, 2003. **80**(3): p. 217-22.
32. Streiner, D.L., *Starting at the beginning: an introduction to coefficient alpha and internal consistency.* J Pers Assess, 2003. **80**(1): p. 99-103.
33. Netemeyer, R.G., W.O. Bearden, and S. Sharma, *Scaling procedures: Issues and applications*. 2003: Sage Publications.
34. Abuya, T., et al., *The effect of a multi-component intervention on disrespect and abuse during childbirth in Kenya.* BMC pregnancy and childbirth, 2015. **15**(1): p. 224.
35. Ishola, F., O. Owolabi, and V. Filippi, *Disrespect and abuse of women during childbirth in Nigeria: A systematic review.* PloS one, 2017. **12**(3): p. e0174084.
36. Moyer, C.A., et al., *'They treat you like you are not a human being': maltreatment during labour and delivery in rural northern Ghana.* Midwifery, 2014. **30**(2): p. 262-268.
37. Sudhinaraset, M., et al., *Women's status and experiences of mistreatment during childbirth in Uttar Pradesh: a mixed methods study using cultural health capital theory.* BMC pregnancy and childbirth, 2016. **16**(1): p. 332.
38. Abuya, T., et al., *Exploring the prevalence of disrespect and abuse during childbirth in Kenya.* PLoS One, 2015. **10**(4): p. e0123606.
39. Afulani, P.A., T.S. Sayi, and D. Montagu, *Predictors of person-centered maternity care: the role of socioeconomic status, empowerment, and facility type.* BMC Health Serv Res, 2018. **18**(1): p. 360.
40. Asefa, A. and D. Bekele, *Status of respectful and non-abusive care during facility-based childbirth in a hospital and health centers in Addis Ababa, Ethiopia.* Reproductive health, 2015. **12**(1): p. 33.
41. Sethi, R.A.-O.h.o.o., et al., *The prevalence of disrespect and abuse during facility-based maternity care in Malawi: evidence from direct observations of labor and delivery.* (1742-4755 (Electronic)).
42. Raj, A., et al., *Associations Between Mistreatment by a Provider during Childbirth and Maternal Health Complications in Uttar Pradesh, India. LID - 10.1007/s10995-017-2298-8 [doi]*. (1573-6628 (Electronic)).

43. Dey, A., et al., *Discordance in self-report and observation data on mistreatment of women by providers during childbirth in Uttar Pradesh, India.* Reproductive Health, 2017. **14**(1): p. 149.
44. Swahnberg, K., et al., *Patients' experiences of abuse in health care: a Nordic study on prevalence and associated factors in gynecological patients.* Acta obstetricia et gynecologica Scandinavica, 2007. **86**(3): p. 349-356.
45. Montesinos-Segura, R., et al., *Disrespect and abuse during childbirth in fourteen hospitals in nine cities of Peru.* International Journal of Gynecology & Obstetrics, 2017.
46. Diamond-Smith, N., et al., *Women's empowerment and experiences of mistreatment during childbirth in facilities in Lucknow, India: results from a cross-sectional study.* BMC Pregnancy and Childbirth, 2017. **17**(2): p. 335.
47. Rosen, H.E., et al., *Direct observation of respectful maternity care in five countries: a cross-sectional study of health facilities in East and Southern Africa.* BMC pregnancy and childbirth, 2015. **15**(1): p. 306.
48. Bohren, M.A., et al., *The mistreatment of women during childbirth in health facilities globally: a mixed-methods systematic review.* PLoS medicine, 2015. **12**(6): p. e1001847.
49. Kruk, M.E., et al., *High-quality health systems in the Sustainable Development Goals era: time for a revolution.* Lancet Glob Health, 2018. **6**(11): p. e1196-e1252.
50. Larson, E., et al., *When the patient is the expert: measuring patient experience and satisfaction with care.* Bulletin of the World Health Organization 2019 p. 1-13.
51. Nilver, H.A.-O.h.o.o., C. Begley, and M. Berg, *Measuring women's childbirth experiences: a systematic review for identification and analysis of validated instruments.* (1471-2393 (Electronic)).
52. Donabedian, A., *The quality of care: how can it be assessed?* Jama, 1988. **260**(12): p. 1743-1748.
53. Shakibazadeh, E., et al., *Respectful care during childbirth in health facilities globally: a qualitative evidence synthesis. LID - 10.1111/1471-0528.15015 [doi].* (1471-0528 (Electronic)).
54. Sando, D., et al., *Methods used in prevalence studies of disrespect and abuse during facility based childbirth: lessons learned.* Reproductive Health, 2017. **14**(1): p. 127.

APPENDICES

Appendix 1. The WHO Typology for Mistreatment of Women During Childbirth*

Third order	Second order	First order
Physical abuse	Use of force	Women beaten, slapped, kicked, and pinched during delivery
	Physical restraint	Women physically restrained to the bed or gagged during delivery
Sexual abuse	Sexual abuse	Sexual abuse or rape
Verbal abuse	Harsh language	Harsh or rude language
		Judgmental and accusatory comments
	Threats and blaming	Threats of withholding treatment or poor outcomes
		Blaming for poor outcomes
Stigma and discrimination	Discrimination based on sociodemographic characteristics	Discrimination based on ethnicity/race/religion
		Discrimination based on age
		Discrimination based on socioeconomic status
	Discrimination based on medical conditions	Discrimination based on HIV status
Failure to meet professional standards of care	Lack of informed consent and confidentiality	Lack of informed consent process
		Breaches of confidentiality
	Physical examinations and procedures	Painful vaginal exams
		Refusal to provide pain relief
		Performance of unconsented surgical operations
	Neglect and abandonment	Neglect, abandonment and long delays
		Skilled attendant absent at time of delivery
Poor rapport between women and providers	Ineffective communication	Poor communication
		Dismissal of women's concerns
		Language and interpretation issues
		Poor staff attitudes
	Lack of supportive care	Lack of supportive care from health workers
		Denial or lack of birth companions
	Loss of autonomy	Women treated as passive participants during childbirth
		Denial of food, fluids and mobility
		Lack of respect for women's preferred birth positions
		Denial of safe traditional practices
		Objectification of women
		Detainment in facilities
Health systems conditions and constraints	Lack of resources	Physical condition of facilities
		Staffing constraints
		Supply constraints
		Lack of privacy
	Lack of policies	Lack of redress
	Facility culture	Bribery and extortion
		Unclear fee structures
		Unreasonable requests of women by health workers

The typology presented in this table is an evidence-based classification system of how women are mistreated during childbirth, based on the findings of the evidence syntheses. The first order themes are identification criteria describing specific events or instances of mistreatment. The second and third order themes further classify these first-order themes into meaningful groups based on common attributes. The third-order themes are ordered from the level of interpersonal relations through the level of the health system

* Reprinted with permission from Bohren MA, Vogel JP, Hunter EC, et al. The mistreatment of women during childbirth in health facilities globally: a mixed-methods systematic review. *PLoS medicine* 2015; **12**(6): e1001847.

Appendix 2a. Distribution of Mistreatment Items by Mistreatment Measure and Facility in Nigeria (N=407, unless otherwise noted)

Sub-Index Item	Facility 1 (n=189) %	Facility 2 (n=116) %	Facility 3 (n=102) %	Total (N=407) %
Interpersonal Abuse Scale (7 items)				
1. Shouted/screamed at	51.9	55.2	51.0	52.6
2. Insulted	22.2	25.0	10.8	20.2
3. Scolded	30.2	23.3	23.5	26.5
4. Mocked	24.9	27.6	7.8	21.4
5. Negative comments	10.1	11.2	14.7	11.6
6. Threatened	13.8	16.4	21.6	16.5
7. Physical abuse	24.3	28.5	30.4	27.0
Mean Scale Score (± SD)	1.8 (1.8)	1.9 (1.6)	1.6 (1.8)	1.8 (1.8)
Max: 7 points	*[range: 0-7]*	*[range: 0-7]*	*[range: 0-7]*	*[range: 0-7]*
% of women > country mean	47.1	53.5	44.1	48.2
Exams & Procedures Index (3 items) (N=350)	**n=165**	**n-101**	**n=84**	**n=350**
1. Informed consent	80.6	90.1	60.7	78.6
2. Exposed	87.3	59.4	72.6	75.7
3. Confidential information	61.2	27.7	44.1	47.4
Mean Index Score (± SD)	2.3 (0.9)	1.8 (1.6)	1.8 (1.0)	2.0 (0.98)
Max: 3 points	*[range: 0-3]*	*[range: 0-3]*	*[range: 0-3]*	*[range: 0-3]*
% of women > country mean	52.7	26.7	26.2	38.9
Unsupportive Birth Environment Index (11 items)				
1. Pain relief	91.5	96.6	91.2	92.9
2. No interpreter	0.5	0.9	1.0	0.7
3. No staff present at birth	11.1	1.7	7.8	7.6
4. Neglected	2.7	0.9	0	1.5
5. Bribe	4.2	5.2	0	3.4
6. Clean up blood/fluids	2.1	0.9	1.0	1.5
7. Fluids	28.6	37.1	76.5	43.0
8. Mobilize	93.1	100.0	87.3	93.6
9. No curtains/partitions	90.5	76.7	98.0	88.5
10. No bed	2.1	0	1.0	1.2
11. Shared bed	0.5	0	0	0.3
Mean Index Score (± SD)	3.3 (0.8)	3.2 (0.7)	3.6 (0.8)	3.3 (0.8)
Max: 11 points	*[range: 1-6]*	*[range: 1-5]*	*[range: 1-6]*	*[range: 1-6]*
% of women > country mean	33.3	32.8	67.7	41.8

Appendix 2b. Distribution of Mistreatment Items by Mistreatment Measure and Facility in Ghana (N=912, unless otherwise noted)

Sub-Index Item	Facility 4 (n=306) %	Facility 5 (n=294) %	Facility 6 (n=312) %	Total (N=655) %
Interpersonal Abuse Scale (7 items)				
1. Shouted/screamed at	20.9	18.0	23.1	20.7
2. Insulted	2.6	2.0	3.9	2.9
3. Scolded	15.7	2.0	6.4	8.1
4. Mocked	2.0	1.7	3.5	2.4
5. Negative comments	3.6	5.8	6.7	5.4
6. Threatened	4.6	5.1	8.0	5.9
7. Physical abuse	8.5	7.1	8.7	8.1
Mean Scale Score (± SD)	0.6 (0.9)	0.4 (0.9)	0.6 (1.1)	0.5 (1.0)
Max: 7 points	*[range: 0-5]*	*[range: 0-5]*	*[range: 0-6]*	*[range: 0-6]*
% of women > country mean	36.0	24.2	33.7	31.4
Exams & Procedures Index (3 items) (N=797)	**n=298**	**n=195**	**n=304**	**n=797**
1. Informed consent	78.9	59.5	74.7	72.5
2. Exposed	7.7	5.1	6.6	6.7
3. Confidential information	4.0	1.0	6.3	4.1
Mean Index Score (± SD)	0.9 (0.6)	0.7 (0.6)	0.9 (0.6)	0.8 (0.6)
Max: 3 points	*[range: 0-3]*	*[range: 0-3]*	*[range: 0-3]*	*[range: 0-3]*
% of women > country mean	81.2	60.0	76.6	74.3
Unsupportive Birth Environment Index (11 items)				
1. Pain relief	85.6	80.3	92.0	86.1
2. No interpreter	2.0	0.3	1.6	1.3
3. No staff present at birth	2.9	0.7	1.9	1.9
4. Neglected	0	0	0.6	0.2
5. Bribe	0	0.7	1.3	0.7
6. Clean up blood/fluids	0	0	0	0
7. Fluids	45.8	47.3	38.1	43.6
8. Mobilize	75.5	72.1	79.8	75.9
9. No curtains/partitions	11.4	19.7	14.4	15.1
10. No bed	1.3	1.0	0.3	0.9
11. Shared bed	2.0	1.0	0.6	1.2
Mean Index Score (± SD)	2.3 (1.1)	2.2 (1.1)	2.3 (0.8)	2.3 (1.0)
Max: 11 points	*[range: 0-5]*	*[range: 0-5]*	*[range: 0-4]*	*[range: 0-5]*
% of women > country mean	47.4	40.1	46.8	44.9

Appendix 2c. Distribution of Mistreatment Items by Mistreatment Measure and Facility in Guinea (N=655, unless otherwise noted)

Sub-Index Item	Facility 7 (n=222) %	Facility 8 (n=219) %	Facility 9 (n=214) %	Total (N=655) %
Interpersonal Abuse Scale (7 items)				
1. Shouted/screamed at	21.2	20.1	22.4	21.2
2. Insulted	3.2	2.7	2.3	2.8
3. Scolded	9.9	10.1	15.9	11.9
4. Mocked	10.4	5.9	7.5	7.9
5. Negative comments	4.5	1.4	0.9	2.3
6. Threatened	6.3	1.4	2.3	3.4
7. Physical abuse	16.7	16.9	14.0	15.9
Mean Scale Score (± SD)	0.7 (1.2)	0.6 (0.9)	0.7 (0.9)	0.7 (1.0)
Max: 7 points	*[range: 0-7]*	*[range: 0-4]*	*[range: 0-4]*	*[range: 0-7]*
% of women > country mean	38.7	37.0	43.9	39.9
Exams & Procedures Index (3 items) (N=391)	**n=65**	**n=189**	**n=137**	**n-391**
1. Informed consent	21.5	34.9	84.7	50.1
2. Exposed	10.8	14.3	57.7	28.9
3. Confidential information	3.1	15.9	4.4	9.7
Mean Index Score (± SD)	0.4 (0.6)	0.7 (0.6)	1.5 (0.6)	0.9 (0.8)
Max: 3 points	*[range: 0-2]*	*[range: 0-3]*	*[range: 0-3]*	*[range: 0-3]*
% of women > country mean	30.8	58.2	95.6	66.8
Unsupportive Birth Environment Index (11 items)				
1. Pain relief	100.0	86.3	75.7	87.5
2. No interpreter	0	0	0.9	0.3
3. No staff present at birth	14.0	6.4	3.7	8.1
4. Neglected	0	0	2.3	0.8
5. Bribe	0.5	0	19.2	6.4
6. Clean up blood/fluids	0	0	0.5	0.2
7. Fluids	25.2	24.2	43.5	30.8
8. Mobilize	15.8	14.2	27.6	19.1
9. No curtains/partitions	32.9	96.4	61.7	63.5
10. No bed	6.8	4.6	2.3	4.6
11. Shared bed	21.6	32.0	11.7	21.8
Mean Index Score (± SD)	2.2 (1.1)	2.6 (0.9)	2.5 (1.3)	2.4 (1.1)
Max: 11 points	*[range: 0-6]*	*[range: 0-5]*	*[range: 0-6]*	*[range: 0-6]*
% of women > country mean	31.1	49.3	47.7	42.6

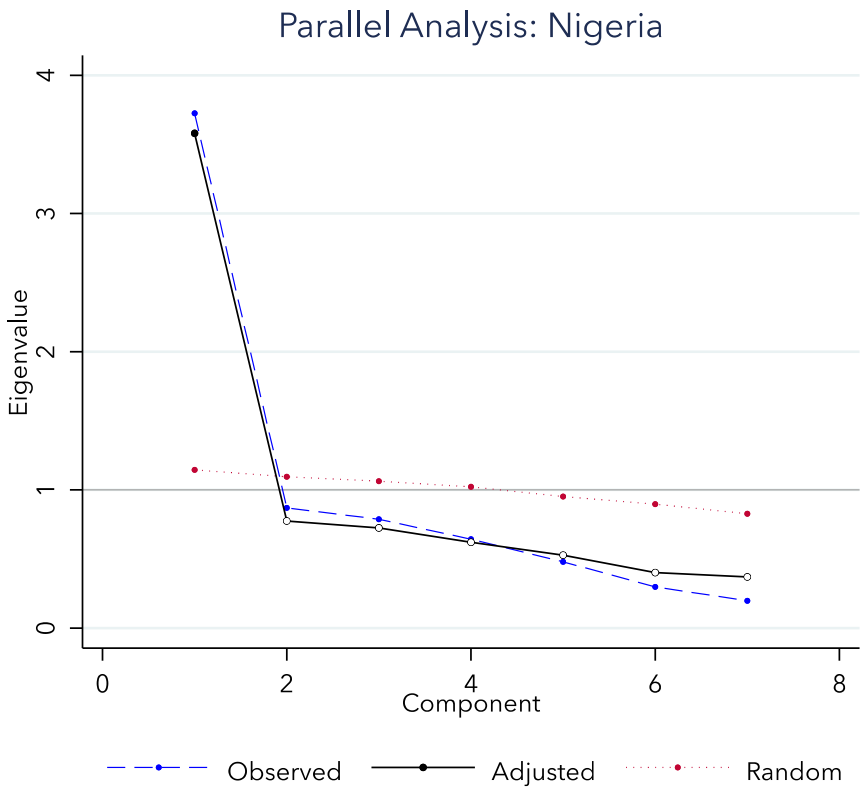
Appendix 3. Tetrachoric Correlation Matrices of the 7-item Interpersonal Abuse Scale for Nigeria, Ghana, and Guinea

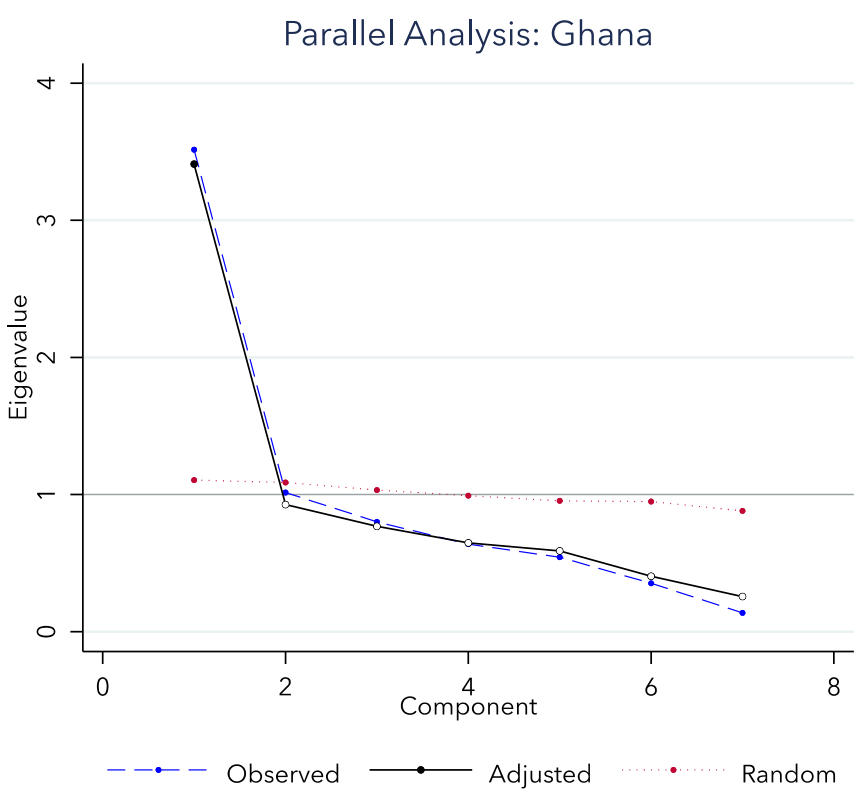
Tetrachoric correlation matrix: NIGERIA (N=407)	Shouted	Insulted	Scolded	Mocked	Threatened	Negative comments	Physical abuse
Shouted	1.00						
Insulted	0.44	1.00					
Scolded	0.59	0.62	1.00				
Mocked	0.43	0.61	0.41	1.00			
Threatened	0.47	0.39	0.36	0.54	1.00		
Negative comments	0.53	0.55	0.52	0.32	0.31	1.00	
Physical abuse	0.60	0.44	0.33	0.42	0.22	0.32	1.00

Tetrachoric correlation matrix: GHANA (N=912)	Shouted	Insulted	Scolded	Mocked	Threatened	Negative comments	Physical abuse
Shouted	1.00						
Insulted	0.58	1.00					
Scolded	0.44	0.24	1.00				
Mocked	0.57	0.60	0.29	1.00			
Threatened	0.32	0.08	0.30	0.45	1.00		
Negative comments	0.57	0.49	0.34	0.43	0.46	1.00	
Physical abuse	0.58	0.58	0.33	0.29	0.30	0.37	1.00

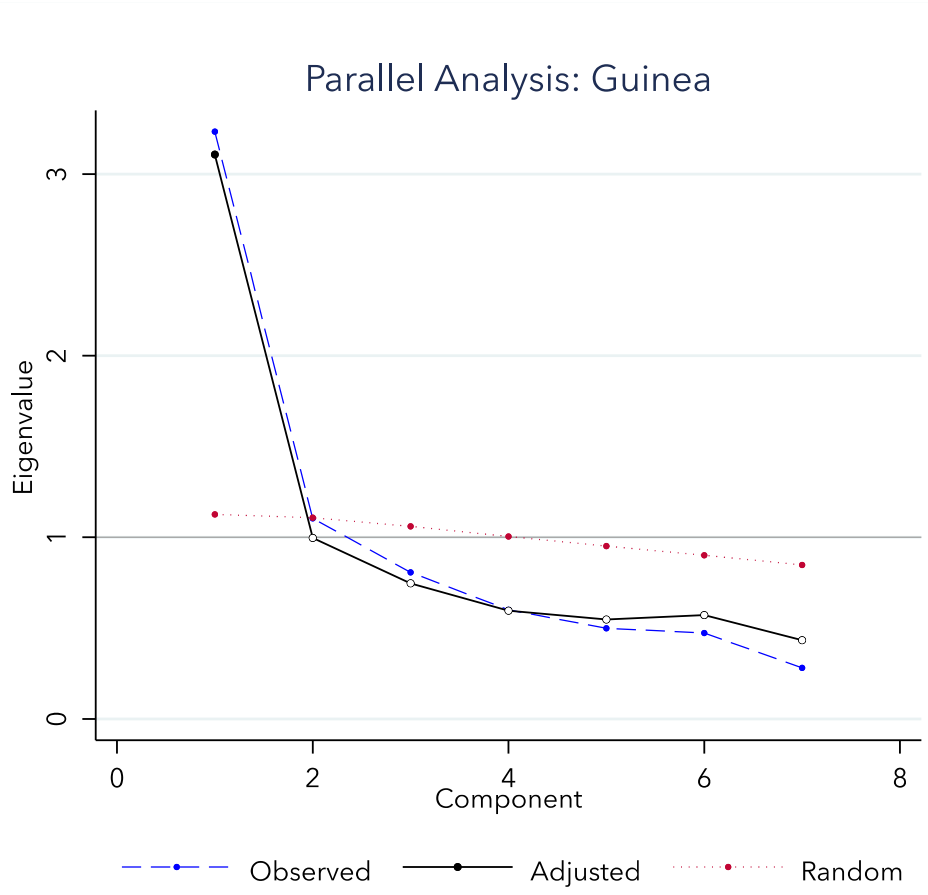
Tetrachoric correlation matrix: GUINEA (N=655)	Shouted	Insulted	Scolded	Mocked	Threatened	Negative comments	Physical abuse
Shouted	1.00						
Insulted	0.51	1.00					
Scolded	0.43	0.40	1.00				
Mocked	0.45	0.44	0.41	1.00			
Threatened	0.31	0.29	0.39	0.38	1.00		
Negative comments	0.23	0.37	0.24	0.57	0.33	1.00	
Physical abuse	0.48	0.54	0.26	0.39	0.18	0.07	1.00

Appendix 4. Parallel Analysis Figures for 7-Item Interpersonal Abuse Scale from Principal Components Analysis in Nigeria, Ghana, and Guinea





Appendix 4 (*cont.*). Parallel analysis figures for 7-Item Interpersonal Abuse Scale from principal components analysis in Nigeria, Ghana, and Guinea



Appendix 5a. Spearman-Rank Correlations Between Mistreatment Measures by Facility, Nigeria (N=407)

Measurement	Interpersonal Abuse Scale	Exams & Procedures Index	Supportive Environment Index
		Facility 1 (N=189)	
Interpersonal Abuse Scale	1.00		
Exams & Procedures Index	0.09	1.00	
Unsupportive Birth Environment Index	-0.005	-0.04	1.00
		Facility 2 (N=116)	
Interpersonal Abuse Scale	1.00		
Exams & Procedures Index	0.18	1.00	
Unsupportive Birth Environment Index	-0.05	0.12	1.00
		Facility 3 (N=102)	
Interpersonal Abuse Scale	1.00		
Exams & Procedures Index	**0.41***	1.00	
Unsupportive Birth Environment Index	-0.18	**-0.24***	1.00

*p<0.05

Appendix 5b. Spearman-Rank Correlations Between Mistreatment Measures by Facility, Ghana (N=912)

Measurement	Interpersonal Abuse Scale	Exams & Procedures Index	Supportive Environment Index
		Facility 4 (N=306)	
Interpersonal Abuse Scale	1.00		
Exams & Procedures Index	0.09	1.00	
Unsupportive Birth Environment Index	-0.05	0.09	1.00
		Facility 5 (N=294)	
Interpersonal Abuse Scale	1.00		
Exams & Procedures Index	0.13	1.00	
Unsupportive Birth Environment Index	0.12	0.11	1.00
		Facility 6 (N=312)	
Interpersonal Abuse Scale	1.00		
Exams & Procedures Index	**0.14***	1.00	

Unsupportive Birth Environment Index	0.02	**0.20***	1.00

*p<0.05

Appendix 5c. Spearman-Rank Correlations Between Mistreatment Measures by Facility, Guinea (N=655)

Measurement	Interpersonal Abuse Scale	Exams & Procedures Index	Supportive Environment Index
		Facility 7 (N=222)	
Interpersonal Abuse Scale	1.00		
Exams & Procedures Index	**0.29***	1.00	
Unsupportive Birth Environment Index	0.05	0.15	1.00
		Facility 8 (N=219)	
Interpersonal Abuse Scale	1.00		
Exams & Procedures Index	0.03	1.00	
Unsupportive Birth Environment Index	0.11	-0.07	1.00
		Facility 9 (N=214)	
Interpersonal Abuse Scale	1.00		
Exams & Procedures Index	-0.05	1.00	
Unsupportive Birth Environment Index	-0.05	-0.13	1.00

*p<0.05

Appendix 6a. Alternative Test for Internal Consistency of Scores: Percentage of Women with an Observed Mistreatment Item by Number of Items and Mistreatment Measure in Nigeria (N=407, unless otherwise noted)

NIGERIA		Number of Items (%)											
Mistreatment Item		0	1	2	3	4	5	6	7	8	9	10	11
Interpersonal Abuse (7 items)													
Shouted		--	55.1	79.2	86.5	96.4	95.7	100.0	100.0	--	--	--	--
Insulted		--	7.7	14.3	23.1	60.7	87.0	100.0	100.0	--	--	--	--
Scolded		--	10.3	27.3	50.0	64.3	87.0	91.7	100.0	--	--	--	--
Mocked		--	3.9	23.4	42.3	50.0	65.2	91.7	100.0	--	--	--	--
Negative comments		--	1.3	10.4	23.1	28.6	34.8	50.0	100.0	--	--	--	--
Threatened		--	3.9	13.0	30.8	46.4	56.5	66.7	100.0	--	--	--	--
Physical abuse		--	18.0	32.5	44.2	53.6	73.9	100.0	100.0	--	--	--	--
Total	**n**	133	77	77	53	27	23	12	--	--	--	--	--
Women	**%**	32.7	18.9	18.9	13.0	6.6	5.7	3.0	--	--	--	--	--
Exams & Procedures Index (3 items) (n=350)													
Informed consent		--	71.4	78.1	100.0	--	--	--	--	--	--	--	--
Exposed		--	27.1	96.5	100.0	--	--	--	--	--	--	--	--
Confidential information		--	1.4	25.4	100.0	--	--	--	--	--	--	--	--
Total	**n**	30	70	114	--	--	--	--	--	--	--	--	--
Women	**%**	8.6	20.0	32.6	--	--	--	--	--	--	--	--	--
Unsupportive Birth Environment Index (11 items)													
Pain relief		--	--	69.6	94.7	98.7	100.0	100.0	--	--	--	--	--
No interpreter		--	--	--	--	0.7	--	50.0	--	--	--	--	--
No staff present at birth		--	--	2.2	5.3	5.2	69.2	75.0	--	--	--	--	--
Neglect		--	--	--	--	2.0	15.4	25.0	--	--	--	--	--
Bribe		--	--	--	1.1	5.9	15.4	25.0	--	--	--	--	--
Clean up blood/fluids		--	--	--	0.5	1.3	15.4	25.0	--	--	--	--	--
Fluids		--	--	--	13.8	89.5	76.9	50.0	--	--	--	--	--
Mobilize		--	66.7	60.9	96.8	99.4	100.0	100.0	--	--	--	--	--
No curtains/partitions		--	33.3	65.2	87.8	96.7	92.3	100.0	--	--	--	--	--
No bed		--	--	2.2	--	--	15.4	50.0	--	--	--	--	--
Shared bed		--	--	--	--	0.7	--	--	--	--	--	--	--
Total	**n**	0	3	46	188	153	13	--	--	--	--	--	--
Women	**%**	0	0.7	11.3	46.2	37.6	3.2	--	--	--	--	--	--

Appendix 6b. Alternative Test for Internal Consistency of Scores: Percentage of Women with an Observed Mistreatment Item by Number of Items and Mistreatment Measure in Ghana (N=912, unless otherwise noted)

GHANA		**Number of Items (%)**											
Mistreatment Item		0	1	2	3	4	5	6	7	8	9	10	11
Interpersonal Abuse (7 items)													
Shouted		--	52.3	77.8	85.7	100.0	100.0	100.0	--	--	--	--	--
Insulted		--	2.6	3.7	31.4	60.0	25.0	100.0	--	--	--	--	--
Scolded		--	14.8	33.3	48.6	50.0	50.0	--	--	--	--	--	--
Mocked		--	1.3	8.6	20.0	20.0	75.0	100.0	--	--	--	--	--
Negative comments		--	10.3	22.2	20.0	40.0	75.0	100.0	--	--	--	--	--
Threatened		--	5.8	23.5	45.7	60.0	75.0	100.0	--	--	--	--	--
Physical abuse		--	12.9	30.9	48.6	70.0	100.0	100.0	--	--	--	--	--
Total	**n**	626	155	81	35	10	4	--	--	--	--	--	--
Women	**%**	68.6	17.0	8.9	3.8	1.1	0.4	--	--	--	--	--	--
Exams & Procedures Index (3 items) (n=350)													
Informed consent		--	97.8	94.7	100.0	--	--	--	--	--	--	--	--
Exposed		--	1.1	79.0	100.0	--	--	--	--	--	--	--	--
Confidential information		--	1.1	26.3	100.0	--	--	--	--	--	--	--	--
Total	**n**	205	537	38	--	--	--	--	--	--	--	--	
Women	**%**	25.7	67.4	4.8	--	--	--	--	--	--	--	--	
Unsupportive Birth Environment Index (11 items)													
Pain relief		--	66.7	91.1	98.5	100.0	100.0	--	--	--	--	--	--
No interpreter		--	--	1.0	1.2	5.6	25.0	--	--	--	--	--	--
No staff present at birth		--	--	1.0	0.6	14.1	50.0	--	--	--	--	--	--
Neglect		--	--	--	0.6	--	--	--	--	--	--	--	--
Bribe		--	--	--	0.9	4.2	--	--	--	--	--	--	--
Clean up blood/fluids		--	--	--	--	--	--	--	--	--	--	--	--
Fluids		--	6.9	15.9	79.6	97.2	100.0	--	--	--	--	--	--
Mobilize		--	22.6	84.4	97.9	98.6	100.0	--	--	--	--	--	--
No curtains/partitions		--	3.1	5.6	19.5	69.0	50.0	--	--	--	--	--	--
No bed		--	0.6	1.0	0.6	2.8	--	--	--	--	--	--	--
Shared bed		--	--	--	0.60	8.9	75.0	--	--	--	--	--	--
Total	**n**	42	159	302	334	71	--	--	--	--	--	--	
Women	**%**	4.6	17.4	33.1	36.6	7.8	--	--	--	--	--	--	

Appendix 6c. Alternative Test for Internal Consistency of Scores: Percentage of Women with an Observed Mistreatment Item by Number of Items and Mistreatment Measure in Guinea (N=655, unless otherwise noted)

GUINEA		Number of Items (%)											
Mistreatment Item		0	1	2	3	4	5	6	7	8	9	10	11
Interpersonal Abuse (7 items)													
Shouted		--	35.9	71.6	95.2	83.3	100.0	--	100.0	--	--	--	--
Insulted		--	1.3	7.5	9.5	58.3	25.0	--	100.0	--	--	--	--
Scolded		--	19.2	35.8	42.9	83.3	100.0	--	100.0	--	--	--	--
Mocked		--	8.3	19.4	71.4	50.0	100.0	--	100.0	--	--	--	--
Negative comments		--	2.6	9.0	4.8	16.7	25.0	--	100.0	--	--	--	--
Threatened		--	5.8	6.0	9.5	33.3	50.0	--	100.0	--	--	--	--
Physical abuse		--	26.9	50.8	66.7	75.0	100.0	--	100.0	--	--	--	--
Total	**n**	394	156	67	21	12	4	--	--	--	--	--	--
Women	**%**	60.2	23.8	10.2	3.2	1.8	0.6	--	--	--	--	--	--
Exams & Procedures Index (3 items) (n=350)													
Informed consent		--	68.1	90.3	100.0	--	--	--	--	--	--	--	--
Exposed		--	20.3	95.8	100.0	--	--	--	--	--	--	--	--
Confidential information		--	11.5	13.9	100.0	--	--	--	--	--	--	--	--
Total	**n**	130	182	72	7	--	--	--	--	--	--	--	
Women	**%**	33.3	46.6	18.4	1.8	--	--	--	--	--	--	--	
Unsupportive Birth Environment Index (11 items)													
Pain relief		--	70.0	90.4	95.7	97.9	100.0	100.0	--	--	--	--	--
No interpreter		--	--	--	--	1.1	4.4	--	--	--	--	--	--
No staff present at birth		--	--	2.4	12.4	21.5	30.4	--	--	--	--	--	--
Neglect		--	--	--	--	3.2	8.7	--	--	--	--	--	--
Bribe		--	--	1.6	6.2	23.7	21.7	50.0	--	--	--	--	--
Clean up blood/fluids		--	--	--	--	--	4.4	--	--	--	--	--	--
Fluids		--	6.7	18.0	42.2	63.4	91.3	100.0	--	--	--	--	--
Mobilize		--	0.9	8.4	29.2	44.1	56.5	100.0	--	--	--	--	--
No curtains/partitions		--	21.8	62.8	78.9	92.5	87.0	100.0	--	--	--	--	--
No bed		--	--	0.8	5.0	14.0	21.7	100.0	--	--	--	--	--
Shared bed		--	0.9	15.6	30.4	38.7	73.9	50.0	--	--	--	--	--
Total	**n**	16	110	250	161	93	23	2	--	--	--	--	--
Women	**%**	2.4	16.8	38.2	24.6	14.2	3.5	0.3	--	--	--	--	--

Appendix 7a. ALTERNATIVE DISPLAY: Individual, Provider, and Delivery Characteristics by Country, Comparing Low to High Interpersonal Abuse Scale Scores

Country	**Nigeria**		**Ghana**		**Guinea**	
Sample Size	**407**		**912**		**655**	
	Low Score (%)	*High Score (%)*	*Low Score (%)*	*High Score (%)*	*Low Score (%)*	*High Score (%)*
Individual Characteristics						
Age (years)						
15-19	**1.9**	**5.6**	**7.4**	**10.5**	**21.8**	**34.1**
20-29	**41.2**	**48.5**	**46.5**	**55.2**	**54.6**	**53.6**
30+	**56.9**	**45.9**	**46.2**	**34.3**	**23.6**	**12.3**
Education Level						
None/ Primary	6.7	4.1	33.3	32.1	68.7	70.0
Secondary	45.7	41.8	51.2	53.6	24.0	24.1
Post-secondary or higher	47.6	54.1	15.4	14.3	7.4	5.9
Marital status						
Married	95.7	93.9	80.7	80.4	**95.7**	**90.0**
Not married	4.3	6.1	19.3	19.6	**4.3**	**10.0**
Number of previous births						
0	**36.5**	**43.9**	35.9	41.3	**30.5**	**44.1**
1	**25.1**	**29.1**	26.5	29.0	**21.6**	**22.2**
2+	**38.4**	**27.0**	37.5	29.7	**48.0**	**33.7**
Provider Characteristics						
Primary labor attendant[a]						
Nurse/Midwife	90.3	88.4	84.6	84.9	**70.7**	**74.0**
Doctor	6.1	3.7	12.0	9.5	**20.7**	**9.2**
Trainee	3.4	7.9	3.4	5.6	**8.6**	**16.8**
Staff member present at delivery[b]						
Nurse/midwife	83.2	81.3	74.4	78.1	**68.0**	**79.5**
Doctor	16.8	18.7	25.6	21.9	**32.0**	**20.5**
Delivery Characteristics						
Mode of delivery						
Vaginal	**91.0**	**95.9**	82.6	86.7	**81.5**	**92.7**
Cesarean	**9.00**	**4.1**	17.4	13.3	**18.5**	**7.3**
Companion was present during labor and/or delivery	19.0	19.4	11.2	11.2	9.9	10.3
Time of delivery[c]						
Day	47.9	51.0	**40.0**	**48.6**	43.9	41.0
Night	52.1	49.0	**59.9**	**51.4**	56.1	59.0
Day of delivery						
Weekday	78.2	73.5	73.6	74.1	80.5	75.1
Weekend	21.8	26.5	26.4	25.9	19.5	24.9

Table 4.17

Note: Estimates reported in table reflect proportion of women with "high" scores, assessed as those **above the country-specific mean level** compared to those with low" scores, assessed as those **at or below the country-specific mean**. **Bold** estimates indicate a significant ($p \leq 0.05$) difference between groups based on X^2 test for differences. [a]Trainee= medical students, nursing students, midwifery students. [b]Among women with a staff member present at delivery.[c] "Day"= 8:00-17:00 (5:00pm); "Night"=17:01 (5:01pm)-7:59.

Appendix 7b. ALTERNATIVE DISPLAY: Individual, Provider, and Delivery Characteristics by Country, Comparing Low to High Exams & Procedures Index Scores

Country	Nigeria (%)		Ghana n (%)		Guinea n (%)	
Sample Size	**350**		**797**		**391**	
	Low Score	*High Score*	*Low Score*	*High Score*	*Low Score*	*High Score*
Individual Characteristics						
Age (years)						
15-19	3.3	5.2	5.4	8.8	22.3	27.6
20-29	49.5	38.2	49.8	49.5	57.7	52.9
30+	47.2	56.6	44.9	41.7	20.0	19.5
Education Level						
None/ Primary	6.2	4.4	33.0	33.3	**76.8**	**61.6**
Secondary	42.4	42.7	50.8	51.2	**17.6**	**32.0**
Post-secondary or higher	51.4	52.9	16.2	15.5	**5.6**	**6.4**
Marital status						
Married	**96.3**	**91.9**	80.5	82.1	96.2	93.5
Not married	**3.7**	**8.1**	19.5	17.9	3.9	6.5
Number of previous births						
0	45.8	36.8	33.7	42.1	32.3	36.8
1	26.2	26.5	26.8	26.4	22.3	22.2
2+	28.0	36.8	39.5	31.6	45.4	41.0
Provider Characteristics						
Primary labor attendant[a]						
Nurse/Midwife	**86.4**	**94.4**	79.0	86.0	**44.3**	**74.2**
Doctor	**5.8**	**4.8**	17.5	11.1	**45.9**	**15.6**
Trainee	**7.8**	**0.8**	3.5	2.9	**9.8**	**10.2**
Staff member present at delivery[b]						
Nurse/midwife	79.9	82.0	69.7	73.9	**50.9**	**67.5**
Doctor	20.1	18.0	30.4	26.1	**49.2**	**32.5**
Delivery Characteristics						
Mode of delivery						
Vaginal	91.1	94.1	**76.6**	**83.3**	**56.8**	**86.2**
Cesarean	8.9	5.9	**23.4**	**16.7**	**43.1**	**13.8**
Companion was present during labor and/or delivery	20.1	19.9	**6.8**	**13.3**	**8.5**	**18.0**
Time of delivery[c]						
Day	49.1	51.5	**28.8**	**47.1**	44.6	43.7
Night	50.9	48.5	**71.2**	**52.9**	55.4	56.3
Day of delivery						
Weekday	79.4	72.1	73.7	73.1	80.8	79.7
Weekend	20.6	27.9	26.3	26.9	19.2	20.3

Table 4.18

Note: Estimates reported in table reflect proportion of women with "high" scores, assessed as those **above the country-specific mean level** compared to those with low" scores, assessed as those **at or below the country-specific mean**. **Bold** estimates indicate a significant ($p \leq 0.05$) difference between groups based on X^2 test for differences.

[a]Trainee= medical students, nursing students, midwifery students. [b]Among women with a staff member present at delivery. [c] "Day"= 8:00-17:00 (5:00pm); "Night"=17:01 (5:01pm)-7:59.

Appendix 7c. ALTERNATIVE DISPLAY: Individual, Provider, and Delivery Characteristics by Country, Comparing Low to High Unsupportive Birth Environment Index Scores

Country	**Nigeria** *(%)*		**Ghana** *n (%)*		**Guinea** *n (%)*	
Sample Size	**407**		**912**		**655**	
	Low Score	*High Score*	*Low Score*	*High Score*	*Low Score*	*High Score*
Individual Characteristics						
Age (years)						
15-19	4.6	2.4	8.2	8.6	**30.9**	**21.2**
20-29	46.4	42.4	49.5	48.9	**52.1**	**57.0**
30+	49.0	55.3	42.4	42.5	**17.0**	**21.9**
Education Level						
None/ Primary	5.5	5.4	31.8	34.4	69.1	69.4
Secondary	43.4	44.3	53.4	50.1	25.4	22.1
Post-secondary or higher	51.1	50.3	14.8	15.4	5.5	8.5
Marital status						
Married	93.7	96.5	79.7	81.7	92.8	94.3
Not married	6.3	3.5	20.3	18.3	7.2	5.7
Number of previous births						
0	44.3	34.1	36.2	39.4	**41.2**	**28.7**
1	27.0	27.1	26.6	28.1	**20.2**	**24.0**
2+	28.7	38.8	37.2	32.5	**38.6**	**47.3**
Provider Characteristics						
Primary labor attendant[a]						
Nurse/Midwife	89.2	89.6	82.5	87.3	71.4	72.9
Doctor	4.5	5.5	13.1	9.0	17.2	14.9
Trainee	6.3	4.9	4.4	3.7	11.4	12.3
Staff member present at delivery[b]						
Nurse/midwife	**78.2**	**88.4**	74.8	76.5	73.6	71.0
Doctor	**21.8**	**11.6**	25.2	23.5	26.4	29.0
Delivery Characteristics						
Mode of delivery						
Vaginal	92.4	94.7	83.9	83.9	84.8	87.5
Cesarean	7.6	5.3	16.1	16.1	15.2	12.5
Companion was present during labor and/or delivery	17.3	21.8	11.1	11.3	10.1	10.0
Time of delivery[c]						
Day	49.4	49.4	**39.4**	**46.9**	45.7	38.7
Night	50.6	50.6	**60.6**	**53.1**	54.3	61.3
Day of delivery						
Weekday	78.1	72.9	71.8	76.3	75.8	81.7
Weekend	21.9	27.1	28.2	23.7	24.2	18.3

Table 4.19

Note: Estimates reported in table reflect proportion of women with "high" scores, assessed as those **above the country-specific mean level** compared to those with "low" scores, assessed as those **at or below the country-specific mean**. **Bold** estimates indicate a significant ($p \leq 0.05$) difference between groups based on Chi-2 test for differences. [a]Trainee= medical students, nursing students, midwifery students. [b]Among women with a staff member present at delivery. [c] "Day"= 8:00-17:00 (5:00pm); "Night"=17:01 (5:01pm)-7:59.

Appendix 8. SENSITIVITY ANALYSIS: Adjusted Odds Ratios of Individual, Provider, and Delivery Factors Associated with Mistreatment by Country and Mistreatment Measure (Based on Standard Logistic Regression)

	Nigeria (N=407)			**Ghana (N=912)**			**Guinea (N=655)**		
	aOR (95% CI)			***aOR (95% CI)***			***aOR (95% CI)***		
	Interpersonal Abuse	*Exams & Procedures*	*Unsupportive Birth Environment*	*Interpersonal Abuse*	*Exams & Procedures*	*Unsupportive Birth Environment*	*Interpersonal Abuse*	*Exams & Procedures*	*Unsupportive Birth Environment*
Individual Characteristics									
Age *(ref: 20-29 years)*									
15-19 years	3.73 (0.92-17.0)	1.60 (0.38-6.69)	0.82 (0.20-3.36)	1.28 (0.72-2.28)	1.52 (0.71-3.24)	1.19 (0.68-2.09)	1.47 (0.87-2.50)	0.99 (0.43-2.24)	0.82 (0.48-1.43)
30+ years	0.78 (0.48-1.27)	1.64 (0.94-2.88)	1.02 (0.62-1.69)	**0.65* (0.46-0.92)**	1.11 (0.75-1.64)	1.24 (0.90-1.72)	0.64 (0.37-1.14)	1.68 (0.77-3.64)	1.17 (0.70-1.97)
Education Level[a] *(ref: Secondary)*									
None/ Primary	0.84 (0.30-2.32)	0.54 (0.18-1.64)	1.01 (0.37-2.78)	1.00 (0.71-1.40)	1.18 (0.80-1.75)	1.21 (0.89-1.66)	1.20 (0.77-1.87)	**0.43* (0.21-0.86)**	0.97 (0.62-1.51)
Post-secondary or higher	1.11 (0.70-1.76)	1.00 (0.59-1.67)	1.05 (0.66-1.69)	0.91 (0.58-1.42)	0.90 (0.54-1.50)	0.99 (0.65-1.50)	1.02 (0.47-2.22)	0.62 (0.18-2.11)	1.84 (0.86-3.90)
Marital status *(ref: Married)*									
Not married	0.75 (0.24-2.37)	2.85 (0.85-9.58)	0.79 (0.25-2.57)	0.73 (0.47-1.13)	0.66 (0.40-1.07)	0.85 (0.57-1.27)	1.50 (0.70-3.22)	1.11 (0.31-3.91)	1.13 (0.52-2.52)
Number of previous births *(ref: 0)*									
1	1.07 (0.62-1.85)	1.27 (0.68-2.38)	1.24 (0.70-2.19)	0.92 (0.62-1.37)	0.73 (0.45-1.19)	0.84 (0.58-1.23)	0.81 (0.47-1.39)	0.61 (0.26-1.41)	1.74 (1.00-3.04)
2+	0.78 (0.43-1.40)	1.32 (0.68-2.57)	**1.96* (1.01-3.62)**	0.76 (0.50-1.16)	**0.50** (0.31-0.80)**	0.69 (0.47-1.03)	0.68 (0.38-1.23)	0.54 (0.21-1.37)	1.65 (0.91-3.00)
Provider Characteristics									
Primary labor attendant[b] *(ref:Nurse/Midwife)*									
Doctor	0.62 (0.16-2.37)	1.02 (0.49-2.14)	3.89 (0.88-17.1)	1.00 (0.53-1.91)	0.62 (0.32-1.19)	0.56 (0.31-1.02)	0.57 (0.17-1.94)	0.39 (0.07-2.09)	0.69 (0.21-2.25)
Trainee[c]	2.20 (0.80-6.05)	**0.09* (0.01-0.70)**	1.29 (0.49-3.36)	1.80 (0.86-3.78)	0.87 (0.30-2.54)	1.03 (0.50-2.15)	**1.97* (1.07-3.63)**	**0.36* (0.14-0.90)**	0.84 (0.45-1.60)

Staff member present at delivery[de] *(ref:Nurse/Midwife)*									
Doctor	**2.06* (1.02-4.16)**	1.02 (0.49-2.14)	0.25 (0.10-0.58)	0.90 (0.54-1.52)	1.03 (0.57-1.87)	0.96 (0.59-1.56)	0.83 (0.48-1.44)	2.31 (0.91-5.87)	1.64 (0.95-2.83)
Delivery Characteristics									
Mode of delivery *(ref: Vaginal)*									
Cesarean	0.48 (0.12-1.85	0.55 (0.12-2.51)	1.34 (0.29-6.27)	0.85 (0.45-1.62)	0.82 (0.42-1.63)	1.25 (0.69-2.26)	0.70 (0.20-2.44)	**0.16* (0.03-0.87)**	0.84 (0.26-2.76)
Companion present during labor and/or delivery *(ref: Not present)*	0.93 (0.53-1.62)	0.97 (0.52-1.81)	1.67 (0.94-2.96)	1.05 (0.66-1.67)	**2.07* (1.12-3.83)**	1.11 (0.72-1.72)	0.95 (0.52-1.74)	**2.86* (1.22-6.70)**	1.16 (0.64-2.09)
Time of delivery *(ref: Day)*									
Night[f]	0.86 (0.56-1.32)	1.03 (0.64-1.67)	1.03 (0.66-1.59)	**0.74* (0.66-1.67)**	**0.46*** (0.32-0.65)**	**0.71* (0.53-0.93)**	1.08 (0.74-1.56)	0.65 (0.38-1.12)	1.35 (0.94-1.95)
Day of delivery *(ref: Weekday)*									
Weekend	1.42 (0.85-2.37)	1.41 (0.80-2.50)	1.02 (0.60-1.72)	0.98 (0.70-1.37)	1.05 (0.71-1.56)	0.78 (0.57-1.07)	1.29 (0.83-1.99)	1.02 (0.52-1.98)	0.66 (0.42-1.04)

Appendix 8

Note: Adjusted odds ratios show the odds of mistreatment scores **above the country-specific mean level** compared to those **at or below the country-specific mean**. Estimates are derived from standard multivariate logistic regression models ***without*** fixed effects for sensitivity analyses.

[a] n=402 (Nigeria), n=889 (Ghana), n=633 (Guinea). [b] n=385 (Nigeria), n=899 (Ghana), n=636 (Guinea). [c] Trainee= medical students, nursing students, midwifery students. [d] n=372 (Nigeria), n=883 (Ghana), n=570 (Guinea). [e]Among those that had a staff member present at delivery. [f] "Day"= 8:00-17:00 (5:00pm); "Night"=17:01 (5:01pm)-7:59. [*] p≤0.05, ** p≤0.01, *** p≤0.001

CURRICULUM VITAE
BLAIR OLIVIA BERGER

PERSONAL DATA

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EDUCATION

Doctor of Philosophy (PhD)- Doctoral Candidate *2015- 2019 (Expected)*
Department of Population, Family and Reproductive Health
JOHNS HOPKINS BLOOMBERG SCHOOL OF PUBLIC HEALTH, Baltimore, MD

- *Concentration*: Women's Health; *Methods Track:* Epidemiology
- *Advisor*: Donna Strobino, PhD
- *Dissertation*: Developing Measures to Assess Mistreatment of Women During Facility-Based Childbirth

Master of Science in Public Health (MSPH) *2013- 2015*
Department of Population, Family and Reproductive Health
JOHNS HOPKINS BLOOMBERG SCHOOL OF PUBLIC HEALTH, Baltimore, MD

- *Concentration*: Reproductive, Perinatal, and Women's Health; *Methods Track:* Demography
- *Certificate Program***:** Demographic Methods
- *Advisor*: Kristin Mmari, DrPH, MA
- *Thesis*: The Prevalence and Correlates of Physical and Sexual Violence Affecting Female Sex Workers in Swaziland

Bachelor of Arts (BA), Anthropology *2009-2013*
UNIVERSITY OF CALIFORNIA, LOS ANGELES (UCLA), Los Angeles, CA

- *Major:* Biological and medical anthropology; pre-medical studies
- *Minor*: Public Health

PROFESSIONAL EXPERIENCE

Maryland Department of Health and Mental Hygiene, Baltimore, MD
Maternal and Child Health Bureau, Office of Maternal and Child Health Epidemiology
Graduate Student Researcher *08/2017-present*

- Led analysis of PRAMS Maryland data assessing trends, determinants and outcomes associated with repeat childbearing from unintended pregnancies among young adult women (18-24 years of age) in Maryland between 2004-2014
- Led analysis of PRAMS Maryland data examining racial/ethnic differences in the relationship between preexisting health conditions (including pre-pregnancy diagnoses of diabetes, hypertensive disorders, cardiac disorders, or depressive/anxiety disorders) and adverse birth outcomes among women of advanced maternal age; examined racial differences in trends of age at first birth between 2004-2014.

Promundo-US, Washington D.C.
Consultant *03/2017- present*

- Conducted a multi-country, multi-level modeling analyses of Demographic and Health Survey data to develop an index of male dominance in intimate relationships, and assess multi-level effects of dominance on women's contraceptive use and experiences of intimate partner violence.
- Conducted analyses of Demographic and Health Surveys for over 40 countries to examine: 1) barriers/facilitators to male involvement in 1) maternal and newborn health service delivery, and 2) family planning service delivery in low- and middle-resource settings for McArthur Foundation Research Grant Data Brief

Jhpiego- an affiliate of Johns Hopkins University, Baltimore, Maryland
Monitoring, Evaluation and Research Team
Graduate Research Trainee *10/2016-12/2017*

- Study on measuring respectful maternity care (RMC) in Kenya
- Study measuring the effectiveness of use of the electronic partogram (ePartogram) vs. the standard-of-care paper partograph on labor management outcomes and labor outcomes in maternity wards in Kenya

Mailman School of Public Health, Columbia University, New York, NY
Department of Sociomedical Sciences
Graduate Research Assistant *05/2015- present*

- Baltimore Growing Girls Project: Conducted in-depth interviews and focus groups, performed qualitative data analysis, and drafted manuscripts on a qualitative study on puberty experiences of adolescent girls in Baltimore City, MD.

World Health Organization, Geneva, Switzerland
Maternal & Perinatal Health and Preventing Unsafe Abortion Team (MPA)
Adolescents and At-Risk Populations Team
Temporary Technical Consultant/ Collaborator *12/2014-present*

- *MPA Team*: Quantitative analytics, systematic reviews and meta analyses on projects related to maternal morbidity/near miss mortality and quality of care (including a Cochrane review of qualitative evidence on continuous labor companionship, as well as involvement in the WHO multi-country study on the mistreatment of women during childbirth for doctoral dissertation research), and women's knowledge and awareness of abortion laws
- *Adolescents and At-Risk Populations Team*: Secondary data analysis of DHS data for 50+ countries on adolescent sexual & reproductive health, looking at differences between married and unmarried adolescents, translated into briefing documents

Department of International Health, Johns Hopkins Bloomberg School of Public Health
International Center for Maternal and Newborn Health, Department of International Health,
Graduate Research Assistant *05/2015-09/2016*

- Study on Postpartum Sepsis: Supplement to Aetiology of Neonatal Infection in South Asia (ANISA) (longitudinal cohort study on postpartum sepsis in Bangladesh and Pakistan)

World Health Organization, Geneva, Switzerland
Maternal & Perinatal Health and Preventing Unsafe Abortion Team (MPA)
Graduate Research Intern *10/2014-12/2014*

- Provided data management, statistical and analytic, and manuscript drafting support on projects related to maternal morbidity/near-miss; Coordinated analysis collaboration on abortion-related

morbidity in Latin America with the Center for Latin American Perinatology/ Pan American Health Organization and led analytic work to inform WHO global abortion estimates project

Johns Hopkins Center for Public Health and Human Rights, Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health, Port Elizabeth, South Africa/ Baltimore, MD
Graduate Research Assistant *05/2014-05/2015*

- Assisted with coordinating a study with the Human Sciences Research Council and TB/HIV Care Association on characterizing strategies to prevent mother-to-child HIV transmission and assess the reproductive health needs of female sex workers in the Eastern Cape of South Africa. Four months spent in South Africa and Lesotho; provided ongoing technical support remotely with the Hopkins team in Baltimore.

UCLA/RAND Prevention Research Center (a CDC Prevention Research Center), UCLA Fielding School of Public Health, Los Angeles, CA
Research Assistant *06/2012-06/2013*

- Assisted with studies on 1) the impact of the Family Medical Leave Act on parents of both newborns and children with special healthcare needs and 2) developing a new group-based model for the delivery of well-child care (WCC) services for low-income children ages 0-3 years.

Violence Intervention Program (VIP Clinic), LAC-USC Medical Center, Los Angeles, CA
Program/Clinic Intern *09/2009-06/2011*

- Assisted the community mental health program director in coordinating and evaluating VIP's multi-pronged medical and community health intervention approach for patients of severe domestic violence: VIP's mentoring and education program, VIP's Forensic Urgent Care Center at LAC-USC, services in the Sexual Assault Center, and the Fetal- Alcohol Specialty Unit.

TEACHING EXPERIENCE

Specific Training in Pedagogy
Johns Hopkins Bloomberg School of Public Health
Evidence-Based Teaching in the Biomedical and Health Sciences: Principles and Practice (2017-2018 year-long course and practicum)

Teaching Experience
Johns Hopkins Bloomberg School of Public Health
Teaching Assistant *01/2015-present*

- ***Demographic Methods for Public Health****;* Graduate-level course (Dr. ME Hughes): 2018
- ***Health Survey Research Methods****; Graduate-level course (Dr. Susan Sherman), Graduate Summer Institute of Epidemiology and Biostatistics: 2017, 2018
- ***Critiquing the Research Literature in Maternal, Perinatal, and Reproductive Health***; Graduate-level course (Dr. Donna Strobino): 2016, 2017
- ***Principles of Population Change****;* Graduate-level course (Dr. William Mosher): 2015, 2016
- ***Life Course Perspectives on Health****;* Graduate-level course (Drs. ME Hughes and Bob Blum): 2016
- ***Population Dynamics and Public Health****; Graduate-level course (Dr. Henry Mosley): 2016 (2 terms)
- ***Women's Health Policy****; Graduate-level course (Dr. Donna Strobino; Dr. Hannah Lantos): 2016, 2018

- ***Issues in the Reduction of Maternal and Neonatal Mortality in Low Income Countries***; Graduate-level course (Drs. Luke Mullany and Linda Bartlett): 2015
- ***Fundamentals of Program Evaluation****; Graduate- level course (Dr. Kristin Mmari): 2015

Johns Hopkins University
Teaching Assistant *09/2015-present*

- ***Sociology of Health and Illness****; Undergraduate-level course (Dr. Emily Agree): 2017-2019 (4 semesters)
- ***Population, Health, and Developmen*****; Head Teaching Assistant, Undergraduate-level course (Dr. Stan Becker): 2015 (1 semester)

*Indicates TA positions with direct involvement in pedagogy: teaching/instruction, lecturing, teaching discussion sections

CENTER & INSTITUTE AFFILIATIONS

Technical Working Group on How Women are Treated During Childbirth, The World Health Organization, Department of Reproductive Health and Research/HRP Programme
Getting to Equal: Increasing Men's Share of Global Contraceptive Responsibliites. Technical working group on male engagement in sexual and reproductive health, FP2020 & Promundo
International Center for Maternal and Newborn Health, The Johns Hopkins Bloomberg School of Public Health
Center for Public Health & Human Rights, The Johns Hopkins Bloomberg School of Public Health
Center for Global Health, The Johns Hopkins University

HONORS/ AWARDS, SCHOLARSHIPS & FELLOWSHIPS

2018-2019	Donald A. Cornely Scholarship in Maternal and Child Health, Department of Population, Family and Reproductive Health, Johns Hopkins Bloomberg School of Public Health
2017-2018	Maternal and Child Health Epidemiology Training Fellowship, Maternal and Child Health Bureau, HRSA (Title V, Department of Health and Human Services) (T03MC07645)
2017-2018	Carl Swan Shultz Fellowship in Population and Reproductive Health, Department of Population, Family and Reproductive Health, Johns Hopkins Bloomberg School of Public Health
2016-2019	Maternal and Child Health Training Grant, Johns Hopkins Bloomberg School of Public Health
2016-2017	Caroline Cochran Scholarship Fund Award in Population and Reproductive Health, Department of Population, Family and Reproductive Health, Johns Hopkins Bloomberg School of Public Health
2015	Master's Essay with Distinction Award for best master's thesis essay, Department of Population, Family and Reproductive Health, Johns Hopkins Bloomberg School of Public Health

2015-2016	Josephine Kohn and Family Fund Scholarship, Johns Hopkins Bloomberg School of Public Health
2014	Center for Global Health Established Field Placement Travel Grant Award Winner, Johns Hopkins University

PUBLICATIONS

Peer Reviewed Publications

1. Herbert A, **Berger B,** Pollack K, Marshall B, Riley A, Walker K, Benjamin-Neelon S, Sommer M. Environmental factors influencing girls' experiences of menstruating at school in a low-income, US, urban context: Findings from a Qualitative Study. *Under Review.*
2. Bohren MA, **Berger BO**, Munthe-Kaas H, Tunçalp Ö. Perceptions and experiences of labour companionship: a qualitative evidence synthesis. *Cochrane Database of Systematic Reviews* 2019, Issue Art. No.: CD012449. DOI: 10.1002/14651858.CD012449.pub2.
3. Bohren MA, Munthe-Kaas H, **Berger BO,** Allanson EE, Tunçalp ÖBohren MA, Munthe-Kaas H, Berger BO, Allanson EE, Tunçalp Ö. Perceptions and experiences of labour companionship: a qualitative evidence synthesis: Protocols. Cochrane Database of Systematic Reviews 2016, Issue 12. Art. No.: CD012449.DOI: 10.1002/14651858.CD012449.
4. Assifi AR, **Berger B**, Tunçalp Ö, Khosla R, Ganatra B (2016) Women's Awareness and Knowledge of Abortion Laws: A Systematic Review. PLoS ONE 11(3): e0152224. doi:10.1371/journal.pone.0152224.
5. **Berger BO**, Grosso A, Adams D, Ketende S, Sithole B, Mabuza XS, et al. The Prevalence and Correlates of Physical and Sexual Violence Affecting Female Sex Workers in Swaziland. *Journal of Interpersonal Violence*. 2016. doi: 10.1177/0886260516629385.

Book Chapters, Reports, and Online Articles

1. Green, ME, **Berger BO,** Hakobyan L, Stiefvater E, Levtov RG. *Getting to Equal: Men, Gender Equality and SRHR and the Global Mandate for Action*. November 2019. Report by Promundo International, supported by the Bill & Melinda Gates Foundation.
2. **Berger BO,** Reid LD. Maryland PRAMS Data Brief: Repeat Births from Unintended Pregnancies among Young Adult Women in Maryland. *Maryland Department of Health and Mental Hygiene*. August 2018.
3. WHO: Adolescent contraceptive use fact sheets for 58 countries. 2016. Access: http://www.who.int/reproductivehealth/adol-contraceptive-use/en/.

Working Papers

1. **Berger BO,** Wolfson CM, Reid LD, Strobino D. Adverse birth outcomes among women of advanced maternal age with and without pre-existing medical conditions: an analysis of Maryland PRAMS. *In Progress (2019).*
2. Herbert A, **Berger BO,** Walker K, Sommer M. Adolescent girls' experiences of menarche in Baltimore City, Maryland: a qualitative tudy. *In progress (2019).*
3. **Berger BO,** Levotv R, Barker G. Male participation in maternal health service delivery in 27 countries: trends and associations. (*Report in Progress, 2019; Publisher: Promundo)*

PRESENTATIONS & MEETINGS

July 2018	**Invited Participant, Extended Research Team.** WHO-MPA Multi-country study on how women are treated during facility-based childbirth primary investigators' meeting. World Health Organization, Geneva, Switzerland.
February 2018	Strobino, DM, **Berger, BO,** Preskitt, J, Kogan, M. *"Evaluating New Evidence: How to Evaluate It and When to Use It."* Workshop given during the Association of Maternal and Child Health Programs (AMCHP) Annual Conference, Washington, DC, USA.
September 2017	*"Introduction to REDCAP Data Entry System for ePartogram study in Kenya."* Presentation given to interns in data extractor training sessions, Jhpiego, Baltimore, MD, USA.
May 2015	"*The Prevalence and Correlates of Physical and Sexual Violence Affecting Female Sex Workers in Swaziland,"* Thesis presentation, Department of Population, Family and Reproductive Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA.
April 2015	**Invited Participant.** International Federation of Gynecology and Obstetrics Initiative "Prevention of Unsafe Abortion" 8th Joint Regional Workshop Between Central America and South America, Panamá City, Panamá.
January 2015	**Invited Participant.** World Health Organization Technical Consultation on the WHO Maternal Near-Miss Approach and Quality of Care: Research and Implementation, Istanbul, Turkey.
July 2014	**Berger, B**, Kose, Z. *Characterizing Strategies to Prevent Mother to Child HIV Transmission among Female Sex Workers in the Eastern Cape of South Africa.* Presented at the Human Sciences Research Council and CDC South Africa Funder's Partnership Meeting, Port Elizabeth, South Africa, 2014.

LEADERSHIP AND SERVICE

Committee Memberships

2017-2019	Board of Academic Ethics, Johns Hopkins Bloomberg School of Public Health ▪ Role (s): Doctoral Student Representative
2015-18	Doctoral Student Council, Johns Hopkins Bloomberg School of Public Health ▪ Role (s): Communications Officer, Departmental Representative

2015-16	Department-Student Association Co-President, Department of Population, Family and Reproductive Health, Johns Hopkins Bloomberg School of Public Health ▪ Role (s): Co-President
Peer Review Service	*PLOS One* *Reproductive Health* *Reproductive Health Matters* *Sexual and Reproductive Healthcare* *Culture, Health and Sexuality* *Women & Health* *Women Deliver Conference 2019* (Abstract Poster Reviewer for "Research or Scholarly Work" and "Evidence-Based Initiatives")

ADDITIONAL INFORMATION

Linguistic skills:	English (Native speaker: speak, read, write); Spanish (Advanced: speak, read, write); Italian (Intermediate: speak, read, write); French (Basic: speak, read, write); Arabic (Basic: speak, read, write)
Software:	STATA, MPLUS, EpiInfo, ATLAS.ti., REDCap,
Fields of interest:	International women's sexual/reproductive health; maternal health; quality of care; severe maternal morbidity, abortion, reproductive epidemiology, social epidemiology, male involvement in MCH/SRH, gender-based violence; autonomy and empowerment